C21.5:949/5

Vol. 949 Number 5

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

August 31, 1976

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

August 31, 1976 Volume 949 Number 5


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# PATENT AND TRADEMARK OFFICE NOTICES

## June and July 1976 Classification Orders

The reclassifications covered by the following classification changes became effective during June and July 1976.

| Classification Order 523, effective June 1, 1976: | Class | Subclasses |
|---|---|---|
| Abolished | 108 | 51–58. |
| Established | 108 | 51.1; 51.3; 52.1; 53.1; 53.3; 53.5; 54.1; 55.1; 55.3; 55.5; 56.1; 56.3; 57.1; 901 and 902. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 524, effective June 28, 1976: | | |
|---|---|---|
| Abolished | 135 | 45–47.5 and 49–64. |
| Established | 135 | 65–86. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 525, effective June 28, 1976: | | |
|---|---|---|
| Abolished | 29 | 121. |
| Established | 29 | 121.1–121.8. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 526, effective July 2, 1976: | | |
|---|---|---|
| Abolished | 2 | 3 and 14. |
| Established | 2 | 410–454. |
| Position changes | 2 | 9 and 15. |
| Title changes | 2 | 15. |

| Classification Order 527, effective July 2, 1976: | | |
|---|---|---|
| Abolished | 264 | 29. |
| | 423 | 417. |
| Established | 264 | 29.1–29.7. |
| | 423 | 447.1–447.9. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 528, effective July 2, 1976: | | |
|---|---|---|
| Abolished | 264 | 40. |
| Established | 264 | 40.1–40.7. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 529, effective July 9, 1976: | | |
|---|---|---|
| Abolished | 277 | 96R and 96A. |
| Established | 277 | 96, 96.1 and 96.2. |
| Position changes | None | |
| Title changes | 277 | 96. |

| Classification Order 530, effective July 13, 1976: | | |
|---|---|---|
| Abolished | 61 | 46; 46.5; 72.1 and 72.3. |
| Established | 61 | 86–114. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 531, effective July 13, 1976: | | |
|---|---|---|
| Abolished | 62 | 58. |
| Established | 62 | 532–545. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 532, effective July 13, 1976: | | |
|---|---|---|
| Abolished | 66 | 86. |
| Established | 66 | 203–214. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 533, effective July 15, 1976: | | |
|---|---|---|
| Abolished | None | |
| Established | 156 | 580.1 and 580.2. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 534, effective July 15, 1976: | | |
|---|---|---|
| Abolished | 252 | 78. |
| Established | 252 | 78.1; 78.3 and 78.5. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 535, effective July 16, 1976: | | |
|---|---|---|
| Abolished | 72 | 453. |
| Established | 72 | 453.01–453.19. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 536, effective July 19, 1976: | | |
|---|---|---|
| Abolished | 355 | 17. |
| Established | None | |
| Position changes | None | |
| Title changes | None | |

| Classification Order 537, effective July 20, 1976: | Class | Subclasses |
|---|---|---|
| Abolished | 137 | 525–525.7. |
| Established | 137 | 843–860. |
| Position changes | None | |
| Title changes | None | |

| Classification Order 538, effective July 20, 1976: | | |
|---|---|---|
| Abolished | 14 | 16; 71; 72 and unnumbered subclass after subclass 69. |
| Established | 14 | 2.4; 2.6; 16.1; 16.5; 69.5; 71.1; 71.3; 71.5; 71.7; and 72.5. |
| Position changes | None | |
| Title changes | 14 | 73. |

| Classification Order 539, effective July 20, 1976: | | |
|---|---|---|
| Abolished | 260 | 209–235. |
| Established | 536 | 1–122. |
| Position changes | None | |
| Title changes | None | |

ALFRED C. MARMOR
*Administrator for Documentation*
*August 6, 1976*

## Board of Appeals Decisions Rendered in the Month of July 1976

| | |
|---|---|
| Examiner affirmed | 208 |
| Examiner affirmed in part | 36 |
| Examiner reversed | 94 |
| Total | 338 |

## WIPO Vacancy

WIPO has announced its intention to fill a vacancy in the position of Head, Industrial Property Development Cooperation Section, Industrial Property Division. Incumbent will be responsible for the implementation of WIPO's program including particularly:

- preparation of model laws and model regulations for developing countries;
- preparing regional agreements and in setting up and organizing regional programs of work and administrations;
- particular questions relating to license contracts and technology transfer contracts;
- information on industrial property matters for developing countries, in particular preparation of seminars and workshops;
- participation in the planning and implementation of activities concerning also other Sections of the Industrial Property Division or other Divisions.

The particular functions of the incumbent will include the following duties:

(a) making proposals for long range and short range programs relating to the above-mentioned tasks;
(b) preparation of, and secretarial assistance to, meetings to be organized by WIPO concerning the above-mentioned tasks;
(c) writing studies dealing with the technical and economic implications of industrial property protection as well as related administrative questions; drafting instruments to be adopted by intergovernmental bodies, legislative texts, work programs and administrative schemes, as required in view of the above-mentioned tasks;
(d) representing WIPO in meetings of other intergovernmental and non-governmental international organizations.

The qualifications required are:

(a) University degree in law or equivalent legal qualification.
(b) Wide professional experience in the field of industrial property (including policies and its international aspects as well as related administrative aspects).

(c) Demonstrated ability to undertake studies and to draft texts as indicated in item (c).

(d) Ability in acting as a representative of WIPO in meetings in which industrial property questions are discussed.

(e) Excellent knowledge of English or French and at least a good knowledge of the other of those two languages. Ability to work in other languages would be an advantage.

The candidate must be less than 55 years of age.

The annual salary (P. 5) ranges from 52,244 Swiss Francs to 62,974 Swiss Francs. Post adjustments, on an annual basis range from 35,614 Swiss Francs to 40,869 Swiss Francs, without dependants; from 45,283 Swiss Francs to 51,965 Swiss Francs, with dependants.

Applications and additional information on WIPO Competition No. 292 can be obtained from the Head of the Administrative Division, World Intellectual Property Organization (WIPO), 32, chemin des Colombettes, 1211 Geneva 20, Switzerland. Closing date for receipt of applications is October 15, 1976.

C. MARSHALL DANN,
*Commissioner of Patents and Trademarks.*

Aug. 4, 1976.

## Patent Suits

**Notices under 35 U.S.C. 290; Patent Act of 1952**

**2,950,775,** R. E. Zwayer, EXHAUST NOISE REDUCING AND AIR DIFFUSING MEANS FOR PNEUMATIC MOTORS, **filed** Mar. 25, 1976, United States Court of Appeals, Sixth Circuit, Ohio (Cincinnati) Doc. 75–150, *The Aro Corporation* v. *Allied Witan Company*. The order of the District Court is affirmed, Mar. 25, 1976.

**3,001,684,** F. A. Wenzel, SERVICE TRAY; **3,140,035, same, filed** Mar. 25, 1976, U.S. Court of Appeals, First Circuit, Mass. (Boston) Doc. 76–1136, *St. Regis Paper Company* v. *Winchester Carton Corporation*.

**3,021,789,** C. E. Ryden, MOTOR SPEED CONTROL ARRANGEMENT, **filed** Dec. 30, 1975, D.C. Oreg. (Portland) Doc. C–75–1179, *Jackson-Rand Corporation* v. *Osgood Controls, Inc., Zercon, Inc. and George M. Osgood*. Consent judgment filed Mar. 22, 1976.

**3,044,594,** J. A. Bernard, REFRIGERATING APPARATUS, **filed** Mar. 31, 1976, D.C., N.D. Tex. (Dallas) Doc. CA3–76–0470C, *General Motors Corporation* v. *John E. Mitchell Company and Sankyo International (U.S.A.), Inc.*

**3,063,024,** L. Davis, Jr., MICROWAVE STRIP TRANSMISSION LINE CIRCULATORS, **filed** Sept. 3, 1975, D.C., M.D. Fla. (Tampa) Doc. 75–635–T–K, *Raytheon Company* v. *Trak Microwave Corp.* Consent decree, Apr. 6, 1976.

**3,140,035.** (See 3,001,684.)

**3,173,583,** E. A. Wahl, BIN ACTIVATOR, **filed** Mar. 19, 1976, D.C.N.J. (Newark) Doc. 76–512, *Carman Industries Inc.* v. *Eugene A. Wahl et al.*

**3,247,310,** H. B. Stinson, Jr., MUSICAL INSTRUMENT; **3,283,056,** Cookerly and Hall, CONTROLLED HARMONIZATION FOR MUSICAL INSTRUMENTS, **filed** Dec. 4, 1975, D.C., S.D. Ind. (Evansville) Doc. EV 75–156–C, *Norlin Music, Inc.* v. *Kimball International, Inc.*

**3,230,891,** Eldredge, Jr., Kirtley, Grusin and Logan, VERTICAL VENETIAN BLIND TRAVERSE APPARATUS, **filed** Mar. 25, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1158, *Gerald M. Grusin and James E. Logan* v. *Braber Company et al.*

**3,283,056.** (See 3,247,310.)

**3,391,484,** P. W. Darin, AILERON CONTROL FOR MODEL AIRPLANES, **filed** Sept. 3, 1975, D.C., E.D. Mich. (Detroit) Doc. 75–71679, *Pio W. Darin* v. *John Josaitis, doing business as Joe's Hobby Center*. Judgment, defendant is permanently enjoined from infringing plaintiff's patent, Mar. 16, 1976.

**3,400,517,** C. R. Sare, DUST COLLECTOR, **filed** Mar. 31, 1976, D.C., N.D.N.Y. (Utica) Doc. 76–C–141, *The W. W. Sly Manufacturing Company* v. *P. & S. Textiles, Inc.* **Same, filed** Jan. 8, 1976, D.C., N.D. Ohio (Cleveland) Doc. C76–19, *The W. W. Sly Manufacturing Company* v. *Royal Wire Products, Inc.* Consent order, plaintiff is owner of said patent. Permanent injunction perpetually restrains defendant from infringement of said patent, Mar. 30, 1976.

**3,601,181,** W. C. Avrea, METHOD AND APPARATUS FOR PURGING AIR FROM INTERNAL COMBUSTION ENGINE COOLING SYSTEMS; **Re. 27,965,** same, PRESSURIZED LIQUID COOLING SYSTEM, **filed** Apr. 6, 1976, D.C. Ariz. (Phoenix) Doc. 76–236, *Saf-Gard Systems, Inc.* v. *Ford Motor Company*.

**3,743,280,** D. G. Martinez, EXERCISING DEVICE, **filed** Mar. 24, 1976, D.C. Puerto Rico (San Juan) Doc. 76–334, *Rainbow Lifeguard Products, Inc., doing business as Rainbow Plastics* v. *Eduardo Diaz Irizarry, doing business as Eddie Imports and Eddie Carpet, Inc.*

**3,753,098,** M. Vrilakas, MACHINE FOR WORKING ON DRIVE SHAFTS, **filed** Mar. 30, 1976, D.C., N.D. Calif. (San Francisco) Doc. C–76–636–SAW, *Drive Line Service, Inc.* v. *Robert F. Gaffney, doing business as Drive Shaft Repair and Edward W. Hobgood, Jr.*

**3,910,744,** C. P. Ronden, APPARATUS FOR BELLING PLASTIC PIPE, **filed** Apr. 5, 1976, D.C., E.D. Pa. (Philadelphia) Doc. C.A. 76–1055, *Grandview Industries, Ltd.* v. *United Plastics Machinery, Inc.*

**Re. 27,965.** (See 3,601,181.)

**D. 208,971,** L. G. Stone, PULL, **filed** May 6, 1975, D.C., S.D. Ind. (Evansville) Doc. EV 75–59–C, *Amerock Corporation* v. *Bliss & Laughlin Industries, Incorporated (Faultless Division)*. Case dismissed without prejudice to the plaintiff, Aug. 22, 1975.

# PATENT NOTICES

## Certificates of Correction for the Week of Aug. 31, 1976

| | | | |
|---|---|---|---|
| Re. 28,240 | 3,913,148 | 3,947,744 | 3,957,086 |
| Re. 28,760 | 3,914,152 | 3,947,813 | 3,957,472 |
| Re. 28,762 | 3,914,232 | 3,948,020 | 3,957,647 |
| D. 239,228 | 3,915,015 | 3,948,076 | 3,957,688 |
| D. 239,596 | 3,915,088 | 3,948,108 | 3,957,769 |
| D. 239,671 | 3,915,377 | 3,948,329 | 3,958,028 |
| D. 239,859 | 3,915,822 | 3,948,802 | 3,958,040 |
| D. 240,094 | 3,915,868 | 3,949,662 | 3,958,126 |
| 3,668,461 | 3,917,754 | 3,949,889 | 3,958,416 |
| 3,748,133 | 3,918,148 | 3,950,395 | 3,958,456 |
| 3,794,841 | 3,919,079 | 3,950,486 | 3,958,683 |
| 3,795,719 | 3,919,199 | 3,950,588 | 3,958,684 |
| 3,802,755 | 3,919,206 | 3,950,736 | 3,959,001 |
| 3,804,638 | 3,919,208 | 3,950,958 | 3,959,036 |
| 3,812,030 | 3,919,231 | 3,951,220 | 3,959,158 |
| 3,812,133 | 3,922,061 | 3,951,708 | 3,959,397 |
| 3,814,119 | 3,922,198 | 3,951,709 | 3,959,412 |
| 3,819,118 | 3,922,341 | 3,951,918 | 3,959 548 |
| 3,819,478 | 3,923,729 | 3,951,964 | 3,959,601 |
| 3,833,598 | 3,924,979 | 3,952,309 | 3,959,706 |
| 3,834,222 | 3,926,690 | 3,952,360 | 3,959,731 |
| 3,835,160 | 3,926,747 | 3,952,535 | 3,959,755 |
| 3,838,145 | 3,927,010 | 3,952,604 | 3,959,839 |
| 3,842,089 | 3,929,795 | 3,952,830 | 3,959,897 |
| 3,842,163 | 3,929,985 | 3,952,853 | 3,959,908 |
| 3,847,908 | 3,929,991 | 3,952,854 | 3,960.117 |
| 3,857,399 | 3,930,900 | 3,952,865 | 3 960,332 |
| 3,862,201 | 3,931,245 | 3,953,089 | 3,960,411 |
| 3,862,224 | 3,931,270 | 3,953,309 | 3,960,519 |
| 3,862,286 | 3,931,750 | 3,953,349 | 3,960,987 |
| 3,863,559 | 3,932,525 | 3,953,467 | 3,961,263 |
| 3,865,039 | 3,932.565 | 3,953,480 | 3,961,447 |
| 3,867,363 | 3,934,014 | 3,953,988 | 3,961,536 |
| 3,868,049 | 3,934,456 | 3,954,011 | 3,961,595 |
| 3,876,150 | 3,934,853 | 3,954,135 | 3,961,618 |
| 3,876,161 | 3,935,223 | 3,954,163 | 3,961.673 |
| 3,877,663 | 3,935,312 | 3,954,356 | 3,961,711 |
| 3,878,778 | 3,937,047 | 3,954,438 | 3,961.912 |
| 3,879,353 | 3,938,954 | 3,954,504 | 3,961,921 |
| 3,879,789 | 3,938,955 | 3,954,516 | 3,962,167 |
| 3,882,069 | 3,939,212 | 3,954,628 | 3,962,254 |
| 3,886,171 | 3,939,764 | 3,954,817 | 3,962,369 |
| 3,886,461 | 3,940,449 | 3,954 840 | 3,962,838 |
| 3,888,984 | 3,941,111 | 3,954,961 | 3,962.946 |
| 3,891,836 | 3,941,750 | 3,955,069 | 3 963,046 |
| 3,892,857 | 3,942,068 | 3,955,095 | 3,963,079 |
| 3,892,885 | 3,942.359 | 3,955,218 | 3,963,081 |
| 3,896,995 | 3,943,914 | 3,955,421 | 3,963,258 |
| 3,897,392 | 3,944,021 | 3,955,601 | 3,963,282 |
| 3,899,404 | 3,944.332 | 3,955,814 | 3,963,284 |
| 3,905,873 | 3,945,560 | 3,955,885 | 3,963,460 |
| 3,905,956 | 3,945,903 | 3,955,966 | 3,963,507 |
| 3,905,970 | 3,945,911 | 3,955,971 | 3,963,723 |
| 3,906,006 | 3,945,948 | 3,956,060 | 3,964.010 |
| 3,907,654 | 3,946,029 | 3,956,171 | 3,964,220 |
| 3,909,440 | 3,946,204 | 3,956,229 | 3,964,255 |
| 3,909,998 | 3,947,070 | 3,956,282 | 3,964,850 |
| 3,910,878 | 3,947,078 | 3,956,492 | 3,965,304 |
| 3,912,390 | 3,947,397 | 3,956,556 | 3,965,305 |
| 3,912,492 | 3,947,456 | 3,956,586 | 3,966,134 |
| 3,912,980 | 3,947,470 | 3,956,880 | |

## Availability of U.S. Patent Reclassification Microfilm

*(Patent and Trademark Office Publication PAT 032.1–7604–M*

The Patent and Trademark Office announces the availability of the microfilm publication "Reclassification Transfer Records" for Reclassification Orders 500 through 519. The record is dated April 1976.

This publication lists all the patent classification changes which were effected in those reclassification orders.

The microfilm provides original and cross-reference transaction records from old classification to new classification in all three of the following sequences:

1. New class/subclass order
2. Patent number order
3. Old class/subclass order

This publication can be used by purchasers to update patent collections which they maintain and listings of patent classification information.

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ALFRED C. MARMOR,
*Administrator for Documentation.*

## Disclaimers

2,916,546.—*Charles P. Ginsburg,* Los Altos, and *Ray M. Dolby,* Redwood City, Calif. VISUAL IMAGE RECORDING AND REPRODUCING SYSTEM AND METHOD. Patent dated Dec. 8, 1959. Disclaimer filed Sept. 23, 1974, by the assignee, *Ampex Corporation.*

Hereby enters this disclaimer to claim 1 of said patent.

3,283,056.—*Jack C. Cookerly,* North Hollywood, and *George R. Hall,* Sherman Oaks, Calif. CONTROLLED HARMONIZATION FOR MUSICAL INSTRUMENTS. Patent dated Nov. 1, 1966. Disclaimer filed Nov. 24, 1975, by the assignee, *Norlin Music, Inc.*

The term of this patent subsequent to Apr. 19, 1983, has been disclaimed.

3,390,281.—*Adrian J. Moses,* Rush City, Minn. CONTROL APPARATUS. Patent dated June 25, 1968. Disclaimer filed Nov. 13, 1974, by the assignee, *Honeywell Inc.*

Hereby enters this disclaimer to all claims of said patent.

3,443,550.—*Howard F. May,* Scotia, and *John M. Kovacik,* Burnt Hills, N.Y., TWO-SECTION HEAT RECOVERY STEAM GENERATOR. Patent dated May 13, 1969. Disclaimer filed June 30, 1976, by the assignee, *General Electric Company.*

Hereby enters this disclaimer to claims 1 through 5 of said patent.

3,449,756.—*Raymond A. Barbeau,* Poughkeepsie, *Rex C. Bradford,* Wappingers Falls, and *Norman R. Fraim* and *Donald E. Lockett,* Poughkeepsie, N.Y. GAP LENGTH-LIMITED SATURATION DEPTH RECORDING. Patent dated June 10, 1969. Disclaimer filed June 12, 1976, by the assignee, *International Business Machines Corporation.*

Hereby enters this disclaimer to the remaining term of said patent.

3,790,403.—*Robert Clark Ribbans III*, Wilmington, Del. GLASS FABRIC COATED WITH CRACK-FREE FLUOROCARBON RESIN COATING AND PROCESS FOR PREPARING. Patent dated February 5, 1974. Disclaimer filed July 13, 1976, by the assignee, *E. I. du Pont de Nemours and Company, Inc.*

Hereby enters this disclaimer to claims 1, 3, 4, 5, 6 and 7 of said patent.

---

3,843,985.—*Horst M. Leonhardt*, Boston, Mass. MACHINE FOR ROUGHING THE MARGIN OF AN UPPER OF A SHOE ASSEMBLY. Patent dated Oct. 29, 1974. Disclaimer filed July 25, 1975, by the assignee, *International Shoe Machine Corporation.*

Hereby enters this disclaimer to claim 17 of said patent.

---

3,856,693.—*You Song Kim*, Emmaus, Pa. METHOD FOR PRODUCING LEAD ZIRCONATE TITANATE POLYCRYSTALLINE CERAMICS. Patent dated Dec. 24, 1974. Disclaimer filed July 12, 1976, by the assignee, *Bell Telephone Laboratories, Incorporated.*

Hereby enters this disclaimer to all claims of said patent.

---

3,867,685.—*Adel Abdel Aziz Ahmed*, Annandale, N.J. FRACTIONAL CURRENT SUPPLY. Patent dated Feb. 18, 1975. Disclaimer filed July 19, 1976, by the assignee, *RCA Corporation.*

Hereby enters this disclaimer to claim 19 of said patent.

---

3,886,466.—*Carl Franklin Wheatley, Jr.*, Somerset, N.J. BIAS CIRCUITRY FOR STACKED TRANSISTOR POWER AMPLIFIER STAGES. Patent dated May 27, 1975. Disclaimer filed Mar. 24, 1976, by the assignee, *RCA Corporation.*

Hereby enters this disclaimer to claim 16 of said patent.

---

3,894,404.—*David J .Stanton*, New Brighton, Minn. HOT GAS DEFROST REFRIGERATION SYSTEM. Patent dated July 15, 1975. Disclaimer filed Mar. 29, 1976, by the assignee, *Honeywell Inc.*

Hereby enters this disclaimer to claims 1 through 8 of said patent.

---

3,911,283.—*Robert A. Williams*, Vandergrift, Pa. PERSONNELL IONIZING RADIATION DOSIMETER. Patent dated Oct. 7, 1975. Disclaimer filed July 15, 1976, by the assignee, *Atlantic Richfield Company.*

Hereby enters this disclaimer to claims 1–6, 9, and 11–22 of said patent.

---

## Patents Available for Licensing or Sale

D. 232,796. PLATE TRAY. Clement J. Smith, P.O. Box 15000, Houston, Tex. 77028.

3,362,040. LOCKING DEVICE. V. W. Gurzenda. Correspondence to: William V. Gurzenda, Rockwood Manufacturing Company, Rockwood, Pa. 15557.

3,635,519. TURBIN COMBUSTION MOTOR. Charles R. LeComte, 6330 Laurel St., North Burnaby 2, British Columbia, Canada.

3,755,874. APPARATUS FOR WRAPPING SCREW-TYPE ELECTRICAL TERMINALS. Van G. Kellems, 879 S. Wanamaker Road, Coupeville, Wash. 98239.

3,789,238. OPEN SWITCH BYPASS CIRCUITS. Shelley M. Presentey, Ottawa, Ontario, Canada. Correspondence to: Striker, Striker, & Stenby, 360 Lexington, Ave., New York, N.Y. 10017.

3,818 154. JOYSTICK TYPE CONTROLLER FOR SWITCHES. Shelley M. Presentey, Ottawa, Ontario, Canada. Correspondence to: Striker, Striker & Stenby, 360 Lexington Ave., New York, N.Y. 10017.

3,840,196. DEVICE FOR ANCHORING LEADERS OF FLEXIBLE STRIPS IN THE CORES OF REELS OR THE LIKE. Shelley M. Presentey, Ottawa, Ontario, Canada. Correspondence to: Striker, Striker & Stenby, 360 Lexington Ave., New York, N.Y. 10017.

3,893,706. CHILDREN'S RATCHET PROPELLED RIDING TOY. Elmer R. Hagen, 230 W. Genesee, Auburn, N.Y. 13021.

3,899,157. TACK FASTENER STRIPPER. Robert Thomas, 30 W. Chicago Ave., Chicago, Ill. 60610.

3,911,752. REMOTE CONTROL CHANNEL CHANGER FOR TELEVISION RECEIVERS. Stephen A. Lazorcak, P.O. Box 33082, District Heights, Md. 20028.

3,912,633. OIL FILTER WITH PULL TAB DRAIN. Arthur Delaney, 521 W. 73rd St., Downers Grove, Ill. 60515.

3,914,976. SPLIT-SHOT APPLICATOR. Fisherman's Tool. Harold A. Karr, 6930 Sylvan Road, Citrus Heights, Calif. 95610.

3,915,323. VERSATILE BOAT LOADER APPARATUS USED ON RECREATIONAL VEHICLES. Oscar E. Underhill, 1009 Barrow St., Anchorage, Alaska 99501

3,933,112. ROAD BOAT. Sidney Edwin Veazey, 1611 Crofton Parkway, Crofton, Md. 21113.

3,937,485. COLLAPSIBLE LUGGAGE CARRIER. Ruth W. and John E. Shourek, 17520 S. 70th Court, Tinley Park, Ill. 60477.

3,944,499. NON-AQUEOUS CLEANING COMPOSITION. Sabina Staniek, Newark, N.J. Correspondence to: Laurence, Stokes & Nellan, Crystal Plaza One, Suite 805, 2001 Jefferson Davis Highway, Arlington, Va. 22202.

3,947,221. PERSONAL PROTECTION DEVICE USING FLASHCUBES. Francis P. Mauser, 1014 Smithfield St., Parkersburg, W. Va. 26101.

3,947,843. ARRANGEMENT FOR PREVENTING AMBIGUITY IN DIGITAL DISPLACEMENT MEASURING APPARATUS. Shelley M. Presentey, Ottawa, Ontario, Canada. Correspondence to: Striker, Striker & Stenby, 360 Lexington Ave., New York, N.Y. 10017.

3,949,470. SAFETY RAZOR. Charles L. Hall, P.O. Box 908, Del Mar, Calif. 92014.

3,949,488. EDUCATIONAL ASSOCIATIVITY DOLL. Venus Lorraine Welch, 2 Retinue Court, Apt. T–3, Baltimore, Md. 21207.

3,954,619. SCUM DRAG. L. John Fry, 1223 N. Nopal St., Santa Barbara, Calif. 93103.

3 956,781. COLLAPSIBLE COT ASSEMBLY. Otto M. Reemelin, 5720 N. 45th Drive, Glendale, Ariz. 85301.

3,961,386. TOILET SEAT COVER EQUIPMENT. Ferdinand Beno, 3548 W. 25th St., Chicago, Ill. 60623.

3,961,765. MULTI-POSITION CONTAINER HOLDING ARRANGEMENT. Alvin O. Brothers, 2001 E. Franklin St., Evansville, Ind. 47711.

3,961,766. CONTAINER HOLDING ARRANGEMENT. Alvin O. Brothers, 2001 E. Franklin St., Evansville, Ind. 47711.

3,961,789. NET TIGHTENER. Martin S. Tabacheck, Box 514 Stoney Batter Road, Kingsville, Md. 21087.

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The following 2 patents are offered by: Estelle Adler, 330 W. 58th St., New York, N.Y. 10019.

2,597,966. SUCTION APPLYING THERAPEUTIC APPARATUS.

3,516,411. APPARATUS FOR THE THERAPEUTIC TREATMENT OF THE SKIN.

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General Motors Corporation is prepared to grant non-exclucive licenses under the following patents upon reasonable terms.

Application for license may be addressed to the Director, Patent Section, General Motors Building, 3044 W. Grand Blvd., Detroit, Mich. 48202.

3,727,480. TIMED INPUT-OUTPUT MOTION TRANSMITTING DEVICE.

3,727,710. STEER CONTROL FOR A TRACK-LAYING VEHICLE.

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General Electric Company is prepared to grant non-exclusive licenses under the following patents on reasonable terms, to domestic manufacturers.

Applications for licenses under the following patents may be addressed to: Group Patent Counsel, Major Appliance Business Group, General Electric Company, Appliance Park, Louisville, Ky. 40225.

3,558,110. GAS HEATED AUTOMATIC CLOTHES DRYER WITH THERMISTOR FLAME SENSOR CIRCUIT.

3,770,928. RELIABLE SOLID STATE INDUCTION COOKING APPLIANCE WITH CONTROL LOGIC.

3,781,503. SOLID STATE INDUCTION COOKING APPLIANCES AND CIRCUITS.

3,781,504. INDUCTION COOKING APPLIANCE INCLUDING TEMPERATURE SENSING OF INDUCTIVELY HEATED COOKING VESSEL BY RADIATION DETECTION MEANS.

3,781,505. CONSTANT DUTY CYCLE CONTROL OF INDUCTION COOKING INVERTER.

3,781,506. NON-CONTACTING TEMPERATURE MEASUREMENT OF INDUCTIVELY HEATED UTENSIL AND OTHER OBJECTS.

3,786,219. SOLID STATE INDUCTION COOKING SYSTEMS FOR RANGES AND SURFACE COOKING UNITS.

3,786,220. INDUCTION COOKING APPLIANCE INCLUDING TEMPERATURE SENSING OF INDUCTIVELY HEATED COOKING VESSEL.

3,786,222. METALLIC FOIL INDUCTION COOKING.

3,798,404. ELECTRONIC OVEN WITH MODE EXCITER.

3,926,358. APPARATUS AND METHOD FOR DEFORMING TUBING FOR ULTRASONIC WELDING OF THE TUBING TO A PLANAR STRUCTURE.

3,935,714. TEMPERATURE CONTROL SYSTEM OF A REFRIGERATOR-FREEZER.

3,936,627. MICROWAVE OVEN WITH SPECIAL RACK DESIGNS.

3,936,766. MAGNETRON WITH CAPACITIVELY COUPLED EXTERNAL CAVITY RESONATOR.

3,942,853. GASKET ASSEMBLY OF A HOUSEHOLD REFRIGERATOR.

3,944,312. LOCKING DEVICE FOR SPADE-TYPE ELECTRICAL CONNECTORS.

3,949,663. MOUNTING MEANS FOR COMPACTOR REFUSE RECEPTACLE.

3,954,116. SOUND-DAMPENING CONNECTION.

3,955,865. OVEN DOOR COUNTERBALANCE SYSTEM.

Applications for license under the following 1 patent may be addressed to: General Electric Company, Lamp Business Division, Nela Park, Cleveland, Ohio 44112.

3,580,856. GETTER COMPOSITION FOR ELECTRIC LAMPS AND SIMILAR DEVICES.

Application for license under the following 1 patent may be addressed to: Division Patent Counsel, Switchgear & Distribution Transformer Division, General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa. 19142.

3,887,778. VACUUM ARC DEVICE WITH IMPROVED ARC-RESISTANT ELECTRODES.

Applications for licenses under the following 3 patents may be addressed to: General Electric Company, Construction Materials Division, 101 E. Carmel Drive, Suite 205, Carmel, Ind. 46032, Attn. Patent Counsel.

3,833,182. INTEGRAL OPEN MESH SPOOL.

3,949,267. PROTECTIVE STARTING CIRCUIT FOR INVERTER OPERATED GASEOUS DISCHARGE LAMPS.

3,953,763. PULSED XENON ARC LAMP OPERATING CIRCUIT.

Application for license may be addressed to Patent Counsel, Gas Turbine Products Division, General Electric Company, 1 River Road, Building No. 500—2nd Floor, Schenectady, N.Y. 12345.

3,936,227. COMBINED COOLANT FEED AND DOVETAILED BUCKET RETAINER RING.

Application for licenses should be addressed to Division Patent Counsel, Lamp Business Division, General Electric Company, Nela Park, Cleveland, Ohio 44112.

3,599,029. FLUORESCENT LAMP ENVELOPE WITH TRANSPARENT PROTECTIVE COATING.

3,609,436. FLUORESCENT LIGHT SOURCE WITH A PLURALITY OF SEQUENTIALLY ENERGIZED ELECTRODES.

3,617,792. HIGHLY LOADED FLUORESCENT LAMP PARTICULARLY FOR DC OPERATION.

3,646,383. FLUORESCENT PANEL LAMP.

3,683,226. ELECTRIC LAMP APPARATUS HAVING DIFFUSION BARRIER.

3,706,895. FLUORESCENT LAMP HAVING COATED INLEADS.

3,710,172. COMPOSITE THERMIONIC CATHODES FOR GAS DISCHARGE DEVICES.

3,771,007. HIGH INTENSITY LAMP APPARATUS AND METHOD OF OPERATION THEREOF.

3,776,025. EXHAUST MACHINE LEAK DETECTOR AND SHUT OFF.

3,778,662. HIGH INTENSITY FLUORESCENT LAMP RADIATING IONIC RADIATION WITHIN THE RANGE OF 1600–2300 A.U.

3,798,485. LAMP APPARATUS FOR IMPROVING WALL DARKENING CHARACTERISTICS.

3,817,296. METHOD OF MAKING AN ELECTRODE HAVING A FILAMENT WITH EXTENDING LEGS.

3,821,578. STABILIZATION OF MERCURY-VAPOR DISCHARGE LAMPS.

3,833,399. SURFACE TREATMENT OF FLUORESCENT LAMP BULBS AND OTHER GLASS OBJECTS.

3,847,643. SURFACE TREATMENT OF FLUORESCENT LAMP BULBS AND OTHER GLASS OBJECTS.

3,849,689. SEQUENTIAL DISCHARGE FLUORESCENT LAMP.

3,868,242. MOLD FOR ELECTRIC DISCHARGE LAMP.

3,890,530. PRECOAT FOR FLUORESCENT LAMP.

3,899,712. TAPERED HELICAL COMPACT FLUORESCENT LAMP.

3,910,409. CIRCLINE LAMP CARTON.

3,912,828. PRECOAT FOR REPROGRAPHIC LAMPS HAVING OXIDE REFLECTOR COATINGS.

3,919,579. MULTIPLE-FILAMENT ELECTRODES FOR ELECTRIC DISCHARGE LAMPS.

3,928,786. FLUORESCENT LAMP HAVING PARTITIONED VAPOR DISCHARGE.

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The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the patents listed below.

Inquires respecting licenses under RCA patents should be addressed to: RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y. 10036.

3,960,534. METHOD OF ASSEMBLING A LIQUID CRYSTAL CELL.

3,960,620. METHOD OF MAKING A TRANSMISSION MODE SEMICONDUCTOR PHOTOCATHODE.

3,960,753. FUORESCENT LIQUID CRYSTALS.

3,960,790. DISC RECORD AND METHOD OF COMPOUNDING DISC RECORD COMPOSITION.

3,961,100. METHOD FOR DEVELOPING ELECTRON BEAM SENSITIVE RESIST FILMS.

3,961,101. PROCESS FOR IMPROVED DEVELOPMENT OF ELECTRON-BEAM-SENSITIVE RESIST FILMS.

3,961,130. MEMORY DIAL FOR TELETYPEWRITER SUBSCRIBERS.

3,961,131. DISC RECORD LOCKED GROOVE ESCAPE APPARATUS.

3,961,263. BANDSTART DETECTOR SYSTEM FOR A TELEVISION TUNING SYSTEM.

3,961,281. DIGITAL CONTROL SYSTEM.

3,961,358. LEAKAGE CURRENT PREVENTION IN SEMICONDUCTOR INTEGRATED CIRCUIT DEVICES.

3,961,361. GAIN CONTROL ARRANGEMENT USEFUL IN A TELEVISION SIGNAL PROCESSING SYSTEM.

3,961,367. SELF-CLOCKING, ERROR CORRECTING LOW BANDWIDTH DIGITAL RECORDING SYSTEM.

3,961,836. FOCUSED-IMAGE HOLOGRAM SYSTEM PROVIDING INCREASED OPTICAL READOUT EFFICIENCY.

3,961,929. METHOD FOR EMBOSSING A PATTERN IN GLASS.

3,962,004. PATTERN DEFINITION IN AN ORGANIC LAYER.

3,962,143. REACTIVELY-BONDED THICK-FILM INK.

3,962,495. METHOD OF MAKING DUPLICATES OF OPTICAL OR SOUND RECORDINGS.

3,962,549. THRESHOLD DETECTOR CIRCUITRY, AS FOR PCM REPEATERS.

3,962,602. SIDE PINCUSHION CORRECTION SYSTEM.

3,962,679. HANDWRITING IDENTIFICATION TECHNIQUE.

3,962,764. METHOD OF INSTALLING A MOUNT ASSEMBLY IN A MULTI-BEAM CATHODE RAY TUBE.

3,962,765. METHOD OF INSTALLING A MOUNT ASSEMBLY IN A MULTI-BEAM CATHODE RAY TUBE.

3,963,536. METHOD OF MAKING ELECTROLUMINESCENT SEMICONDUCTOR DEVICES.

3,963,860. LOCKED GROOVE DETECTION AND CORRECTION IN VIDEO DISC PLAYBACK APPARATUS.

3,963,861. DISC RECORD GROOVE SKIPPER APPARATUS.

3,963,864. PICKUP ARM ASSEMBLY.

3,963,963. GROUND-FAULT DETECTION SYSTEM.

3,963,998. VARIABLE BANDWIDTH TUNABLE DIRECTIONAL FILTER.

3,964,031. MEMORY CELL.

3,964,301. ENGINE BRAKE HORSEPOWER TEST WITHOUT EXTERNAL LOAD.

3,964,336. STEERABLE MOUNT.

3,964,812. METHOD FOR PRODUCING A STRONTIUM METAL FILM ON INTERNAL SURFACES OF A CRT.

3,964,909. METHOD OF PREPARING A PATTERN ON A SILICON WAFER.

3,964,986. METHOD OF FORMING AN OVERLAYER INCLUDING A BLOCKING CONTACT FOR CADMIUM SELENIDE PHOTOCONDUCTIVE IMAGING BODIES.

3,965,420. APPARATUS FOR NON-DESTRUCTIVELY TESTING THE VOLTAGE CHARACTERISTICS OF A TRANSISTOR.

3,965,442. CMOS OSCILLATOR.

3,965,482. VELOCITY CORRECTION CIRCUIT FOR VIDEO DISCS.

3,966,287. LOW-VOLTAGE AGING OF CATHODE-RAY TUBES.

3,966,474. METHOD FOR IMPROVING ADHERENCE OF PHOSPHOR-PHOTOBINDER LAYER DURING LUMINESCENT-SCREEN MAKING.

3,967,182. REGULATED SWITCHED MODE MULTIPLE OUTPUT POWER SUPPLY.

3,967,207. AMPLIFIER WITH OVER-CURRENT PROTECTION.

3,967,254. CHARGE TRANSFER MEMORY.

3,967,295. INPUT TRANSIENT PROTECTION FOR INTEGRATED CIRCUIT ELEMENT.

3,967,311. VELOCITY CORRECTION FOR VIDEO DISCS.

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Eastman Kodak Company announces that non-exclusive licenses on reasonable terms are available under the 3 patents listed below:

U.S. 3,875,297. METHOD FOR MAKING FERROMAGNETIC CHROMIUM DIOXIDE.

U.S. 3,880,689. MAGNETIC DEVELOPER CONTAINING AN ELECTROLESS PLATING SENSITIZER, AND METHOD OF USING SAME.

U.S. 3,935,578. THERMO-MAGNETIC IMAGE RECORDING METHODS AND APPARATUS.

Inquiries may be addressed to: Director, Corporate Commercial Affairs, Eastman Kodak Company, 343 State St., Rochester, N.Y. 14650.

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The following notice amends the notice published in the OFFICIAL GAZETTE of May 13, 1975 to extend the royalty free immunity under foreign patents to apparatus manufactured outside of the United States and sold for use or used within the United States and to extend certain dates until March 1, 1977.

"International Business Machines Corporation hereby grants to any party a non-exclusive, royalty free license to make, use and sell apparatus, within or without the U.S. Government, which employs the data encryption information published in the *Federal Register* of March 17, 1975, Vol. 40, Fed. Reg. 12134-12138 for consideration in the Federal standard-making process, or complies with an encryption standard based on such information or complies with a revised standard based on such information and using alternative cryptographically secure functions, under:

(a) all claims in U.S. Patent No. 3,796,830 entitled "Recirculating Block Cipher Cryptographic System" issued March 12, 1974, in the name of John Lynn Smith, and U.S. Patent No. 3,798,359, entitled "Block Cipher Cryptographic System" issued March 19, 1974, in the name of Horst Feistel, and

(b) all those claims in any other United States patent, which is presently assigned to IBM or which is hereafter assigned to IBM, the infringement of which claims could not be avoided by any apparatus which can be constructed and operated for the purpose of employing the published data encryption information or complying with the standard(s).

Such license extends throughout the United States and includes a royalty free immunity from suit, with respect to apparatus which employs the published data encryption information or complies with the standard(s) and (a) is manufactured in the United States, or (b) is manufactured outside of the United States and is sold for use or used within the United States, under any and all foreign patents now or hereafter assigned to IBM, the infringement of which could not be avoided by any apparatus which can be constructed and operated for the purpose of employing the published data encryption information or complying with the standard(s).

In the event that the standard is not established by the Department of Commerce by March 1, 1977, then such license shall extend only to apparatus manufactured after the date of the publication of the original notice and prior to March 1, 1977.

For the purposes of this grant, United States is defined as the United States of America, its territories and possessions, Puerto Rico and the District of Columbia.

IBM will grant to any party a written license confirmatory of the rights set forth herein on written request to: IBM Director of Commercial Development, International Business Machines Corporation, Armonk, N.Y. 10504."

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General Electric Company hereby withdraws the following patents from the Register of Patents Available for Licensing. The patents were listed as being available in the OFFICIAL GAZETTE as indicated below.

3,443,550. TWO-SECTION HEAT RECOVERY STEAM GENERATOR. February 22, 1972.

3,850,856. Should be deleted from the Register of Patents in view of the fact that this patent is not owned by General Electric Company. Published March 29, 1976.

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF AUGUST 14, 1976

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 1-2-76 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 1-2-76 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 10-1-75 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products: Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 9-17-75 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 1-2-76 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures: Illumination: Horology; Acoustics; Recorders; Weighing Scales. | 5-21-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 11-6-75 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 11-3-75 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Tescing; Indicating. | 2-13-76 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 12-3-75 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 4-30-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 11-10-75 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 2-18-76 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 12-22-75 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 8-7-75 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 2-2-76 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during August 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,897,500 to 2,901,748 inclusive
Plant Patents..... Numbers 1,856 to 1,860 inclusive

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 28,943

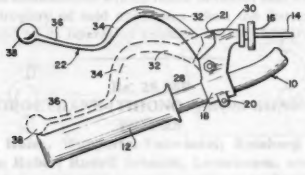
## LEVER FOR BRAKE AND CLUTCH OPERATION ON CYCLE HANDLEBARS

Glen B. Guyton, 3401 E. Newton, Tulsa, Okla. 74115

Original No. 3,720,111, dated Mar. 13, 1973, Ser. No. 150,137, June 4, 1971. Application for reissue Jan. 24, 1974, Ser. No. 436,123

Int. Cl.[2] B62K *23/06*; B62L *3/02*

U.S. Cl. 74—489 7 Claims



*8. In combination with a Bowden control secured to the handlebar of a vehicle for hand operation of the vehicle brake or clutch through manipulation thereof by the fingers of the hand, a pivotal lever secured to the handlebar and operably connected with the Bowden control for actuation thereof and comprising a finger receiving portion engagable by the outer three fingers of the hand for pivoting the lever towards the handlebar while the forefinger and thumb remains encircled about the handlebar in the proximity of the Bowden control, an offset portion spaced from the finger receiving portion, and an integral connecting portion between the offset portion and finger receiving portion and substantially perpendicular to the finger receiving portion whereby said offset portion is spaced away from the handlebar in all positions of the lever to provide clearance for the forefinger encircling the handlebar in the proximity of the Bowden control whereby the brake or clutch may be operated with the forefinger separated from the outer three fingers a minimum amount.*

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Re. 28,944

## HYDRAULIC BRAKE SYSTEM

Atumi Ueda, Kariya, Japan, assignor to Asin Seiki Kabushiki Kaisha, Kariya, Japan

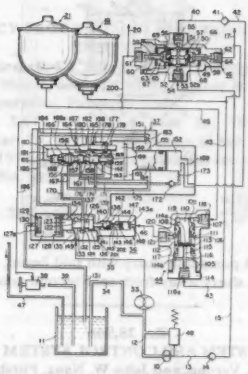
Original No. 3,708,030, dated Jan. 2, 1973, Ser. No. 75,063, Sept. 23, 1970. Application for reissue Jan. 2, 1975, Ser. No. 538,055

Claims priority, application Japan, Sept. 24, 1969, 44-75965; Sept. 24, 1969, 44-75966; Sept. 24, 1969, 44-75967

Int. Cl.[2] B62D *5/06*

U.S. Cl. 180—132 13 Claims

1. A hydraulic control system for a powered vehicle comprising hydraulic source means, first and second hydraulic servo motors, closed hydraulic circuit means containing said hydraulic [pressure] source means and said first servo motor, accumulator means fluidically connected in said closed hydraulic circuit means, control valve means fluidically connected with said first servo motor and said accumulator means for establishing fluid communication therebetween in response to manual operation of said control valve means, first pump means in said closed circuit means for pumping hydraulic fluid under pressure to said accumulator means, and open hydraulic circuit means for fluidically connecting said second servo motor with said hydraulic [pressure] source means, second pump means in said open hydraulic circuit means for pumping hydraulic fluid under pressure to said second servo motor, unloading valve means in said open hydraulic circuit means, means connecting said closed hydraulic circuit means to said unloading valve means whereby said unloading valve means may act under the influence of the hydraulic pressure prevailing in said closed hydraulic circuit means, and additional means connecting said unloading valve means to said



accumulator [valve] means so that said unloading valve means is adapted to deliver hydraulic fluid under pressure from said second pump means to said accumulator means when the pressure of the hydraulic fluid from said first pump means falls below a predetermined pressure.

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Re. 28,945

## METHOD AND APPARATUS FOR EXCAVATING SETTLED BODY OF SOLIDS

John A. Miscovich, Orange, and John J. Gilbert, San Francisco, both of Calif., assignors to Marcona Corporation, San Francisco, Calif.

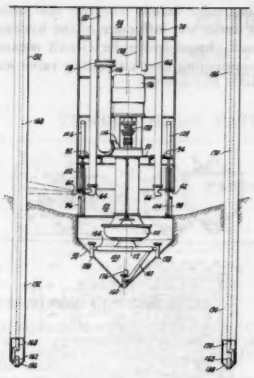
Original No. 3,799,614, dated Mar. 26, 1974, Ser. No. 283,309, Aug. 24, 1972. Application for reissue Mar. 10, 1975, Ser. No. 556,704

Int. Cl.[2] E21C *45/00*

U.S. Cl. 299—17 21 Claims

1. A method for removing a settled body of discrete mineral solids including the steps of directing a stream of liquid through at least one nozzle substantially laterally into a first pulping zone, the nozzle being located at a first predetermined elevation below the upper surface of said body whereby the liquid forms a pumpable slurry with the mineral solids in said zone, pumping the slurry from the zone, traversing the liquid stream through a predetermined path in said zone to form an undercut cavity in said body sufficient to collapse the overburden of mineral solids overlying said cavity, causing the collapsed overburden of mineral solids to be formed into additional pumpable slurry with said liquid, pumping the additional slurry from said zone, directing additional liquid to a region below said nozzle to cause the same to sink downwardly through said solids to a second predetermined elevation below said first elevation, directing said stream of liquid into a second pulping zone located at said second elevation, and repeating said steps of pumping the slurry from said second zone, traversing the liquid stream through a predetermined path in said second zone to form an additional undercut

cavity sufficient to collapse the overburden of mineral solids thereabove, causing the collapsed overburden to be formed



into additional pumpable slurry with said liquid, and pumping the additional slurry away from said second zone.

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**Re. 28,946**

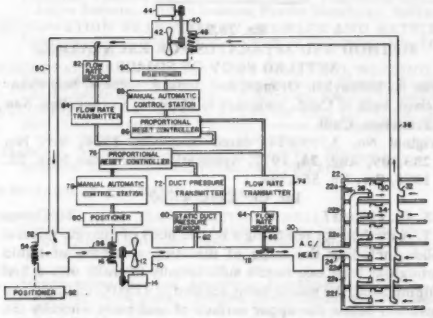
**BLOWER SYSTEM AND CONTROL SYSTEM THEREFOR**

**Lyle F. Martz, Verona, and John W. Nanz, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Original No. 3,695,774, dated Oct. 3, 1972, Ser. No. 148,581, June 1, 1971. Application for reissue Oct. 1, 1974, Ser. No. 510,966**

**Int. Cl.[2] F01B *25/00***

**U.S. Cl. 415—17** **31 Claims**



**1. A blower control system comprising:**

**first means for sensing the supply flow rate produced by a supply blower and generating an output *signal* representative thereof,**

**second means for sensing the discharge pressure produced by the supply blower and generating an output *signal* representative thereof,**

**control means responsive to [the outputs] *said output signals* of said first and second sensing means for producing a control output *signal* dependent on the difference between a desired relationship and the sensed relationship of the supply flow rate and the discharge pressure of the supply blower, *the output signal representative of the supply flow rate being utilized as a varying set point by said control means in producing said control output signal*, and**

**adjustment means responsive to [the] *said* control output *signal* for adjusting the output of [said] the supply blower to attain said desired relationship of the supply flow rate and the discharge pressure of [said] *the* supply blower.**

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**Re. 28,947**

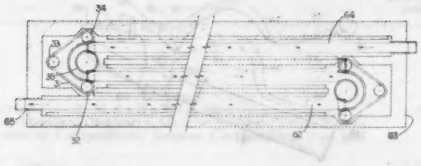
**APPARATUS FOR ANNEALING, CONVEYING, TRANSFERRING, AND SPRAYING GLASSWARE**

**Edward W. Bowman, deceased, late of Uniontown, Pa. (by Muriel B. Bowman, co-executrix), assignor to E. W. Bowman Incorporated, Uniontown, Pa.**

**Original No. 3,741,744, dated June 26, 1973, Ser. No. 201,890, Nov. 24, 1971. Application for reissue Feb. 7, 1975, Ser. No. 547,999**

**Int. Cl.[2] C03B *25/04***

**U.S. Cl. 65—348** **10 Claims**



**1. In an industrial heating furnace, a tunnel shaped chamber comprising heating and cooling sections,**

**a conveyor for moving the articles to be treated through said tunnel,**

**a conveyor for delivering said articles to the charging end of said tunnel,**

**said conveyors being spaced apart *and longitudinally aligned*,**

**and transfer mechanism bridging adjacent ends of said conveyors for engaging the articles on the delivery conveyor and transferring them *directly linearly* to the tunnel conveyor,**

**said transfer mechanism engaging the articles in a manner to expose the bottom of the articles in their travel between adjacent conveyors.**

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**Re. 28,948**

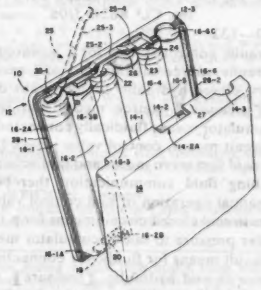
**BATTERY CARTRIDGE WITH HOLLOW CASE OF MINIMUM WEIGHT AND DIMENSIONS**

**Gordon E. Kaye, Garrison, N.Y., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.**

**Original No. 3,887,394, dated June 3, 1975, Ser. No. 394,031, Sept. 4, 1973. Application for reissue Nov. 28, 1975, Ser. No. 635,826**

**Int. Cl.[2] H01M *1/02***

**U.S. Cl. 136—173** **28 Claims**



**1. A battery for use with a portable apparatus, comprising a plurality of cells electrically connected in predetermined electrical relation, and providing two electrode terminals of the battery;**

a case for said cells, consisting of a hollow shell of two co-fitting and mating parts having their internal surfaces shaped to fittingly engage and hold said cells in place;

said case having two windows for access from outside the case to said two electrode terminals of said battery, within said case, for engagement by two external circuit electrode terminals correspondingly positioned on an external apparatus to be serviced by said battery;

and means on said case to cooperate with a predesigned element of said apparatus for requiring the case to be properly positioned and also preventing the case from being improperly positioned in movement to its operating position relative to said apparatus, to assure proper engagement of said internal battery electrode terminals and said external circuit electrode terminals, whereby proper circuit connections will be made between said battery and the circuitry of said apparatus when the battery case is inserted to its operating position on said apparatus.

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**Re. 28,949**

## 2-CHLOROETHANE-(THIONO)-PHOSPHONIC ACID ESTERS

**Wolfgang Hofer, Wuppertal-Vohwinkel; Reinhard Schliebs, Cologne; Robert Rudolf Schmidt, Leverkusen, and Ludwig Eue, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

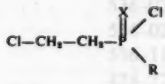
**Original No. 3,846,513, dated Nov. 5, 1974, Ser. No. 76,594, Sept. 29, 1970. Application for reissue Jan. 27, 1975, Ser. No. 544,531**

**Claims priority, application Germany, Oct. 4, 1969, 1950099**

**Int. Cl.² C07F 9/42**

**U.S. Cl. 260—960** **4 Claims**

1. [2-Chloroethanephosphonic acid and] 2-Chloroethanethionophosphonic acid compound of the general formula



in which

X is [oxygen or] sulfur,

R is unsubstituted aryloxy or substituted aryloxy [or] substituted with alkyl, hydroxy or nitro.

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**Re. 28,950**

## STRAW MATS FOR SOIL EROSION CONTROL

**Erwin M. Jankowiak, Sanford, and Gerald H. Brandt, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Original No. 3,867,250, dated Feb. 18, 1975, Ser. No. 417,310, Nov. 19, 1973. Application for reissue Aug. 11, 1975, Ser. No. 603,893**

**Int. Cl.² B32B 9/02; A01G 13/00**

**U.S. Cl. 428—288** **8 Claims**

1. A coherent air and moisture permeable straw mat for covering soil to prevent wind and rain erosion thereof, said mat comprising straw stalks distributed randomly into a layer with the stalks adhered together at their points of contact with each other with at least 75 pounds per ton of straw of a water resistant adhesive consisting essentially of (1) an interpolymer of less than 60 weight percent of an alkenyl aromatic monomer, wherein an alkenyl group is attached directly to an aromatic nucleus, at least 40 weight percent of an open chain conjugated diolefin having from 4 to about 9 carbon atoms, and an unsaturated carboxylic acid or anhydride, (2) from about 0.5 to 2.5 weight percent based on polymer solids of a water soluble cellulose ether and (3) from about 0.7 to 2.5 weight percent of a water-soluble organo sulfonate having at least one sulfonate group attached to an aromatic ring and represented by the formula:

$$R—[ArSO_3]M$$

wherein R is an alkyl chain having from about 8 to 20 carbon atoms, *an alkenyl chain having from about 8 to 20 carbon atoms* and combinations of said chains with ethoxy chains, phenyl, phenoxy and alkyl or alkoxy substituted phenyl or phenoxy: Ar is phenyl or naphthyl and M is an alkali metal or ammonia.

**Re. 28,951**

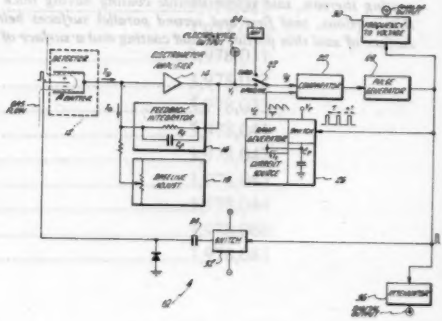
## FREQUENCY-PROGRAMMED ELECTRON-CAPTURE DETECTOR

**J. Howard Marshall, III, Pasadena, and Timothy M. Harrington, Sierra Madre, both of Calif., assignors to Analog Technology Corporation, Pasadena, Calif.**

**Original No. 3,671,740, dated June 20, 1972, Ser. No. 124,291, Mar. 15, 1971. Continuation of Ser. No. 449,915, March 11, 1974, abandoned. Application for reissue June 9, 1975, Ser. No. 585,183**

**Int. Cl.² G01T 1/18**

**U.S. Cl. 250—383** **12 Claims**



*11. For use in combination with an electron-capture detector, a pulse-generating circuit for providing an output signal having a frequency corresponding to and representative of the concentration of an electron-capturing compound, the circuit comprising:*

*a. means coupled to the electron-capture detector for providing a first output signal representative of the relative concentration of an electron-capturing compound in a sample quantity;*

*b. ramp-generator means, including a resettable circuit means exhibiting a change-of-magnitude-with-time charateristic for providing a second output signal of continuously varying magnitude;*

*c. comparator means coupled to said first named means and said ramp-generator means and responsive to applied first and second output signals, for providing a distinctive comparator output signal when said first and second output signals applied thereto have a predetermined magnitude relationship; and*

*d. pulse-generator means coupled to said comparator means, ramp-generator means and the electron-capture detector, said pulse-generator means being operable in response to said distinctive comparator output signals for applying a pulsed signal output to reset said ramp-generator means and to clear the electron-capture detector,*

*whereby said pulse generator produces a pulsed signal output train having a frequency proportional to and representative of the concentration of an electron-capturing compound in a sample.*

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**Re. 28,952**

## SHAPED RISER ON SUBSTRATE STEP FOR PROMOTING METAL FILM CONTINUITY

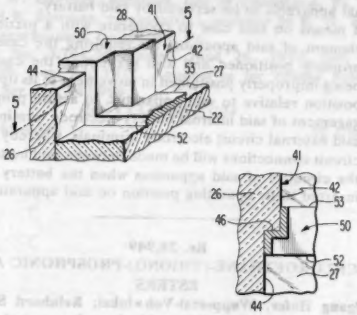
**Andrew Gordon Francis Dingwall, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Original No. 3,703,667, dated Nov. 21, 1972, Ser. No. 125,302, Mar. 17, 1971. Application for reissue June 3, 1974, Ser. No. 476,087**

**Int. Cl.[2] H01L** *23/48, 29/40, 29/78, 29/44*

**U.S. Cl. 357—65** **9 Claims**

**1. A semiconductor device of the type which includes a metal layer on and adhered to a substrate, said substrate having first and second spaced parallel surfaces connected by a riser surface defining a relatively high step,** *said substrate comprising a silicon body having an insulating silicon dioxide coating thereon, said silicon dioxide coating having thick and thin portions, said first and second parallel surfaces being a surface of said thin portion of said coating and a surface of said thick portion of said coating respectively, and said riser surface being a surface of said thick portion of said coating, said riser surface being generally elongated in a given direction,* **said metal layer extending from said first of said parallel surfaces over said riser surface to said second of said parallel surfaces,** *said metal layer having the form of an elongated strip with parallel sides, the direction of elongation of said metal layer*




*being at an angle to that of said riser surface,* **said riser surface of said step being substantially perpendicular to each of said first and said second parallel surfaces, in which**

**at the location where said metal layer extends from said first to said second surface and within the boundaries of said metal layer, said riser surface has at least two non-coplanar portions, each of which extends from said first parallel surface to said second parallel surface.**

# PATENTS

## GRANTED AUGUST 31, 1976

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 092–063 | 3,977,308 |
| 015–104.17 | 3,977,331 |
| 123–140 R | 3,977,343 |
| 115–035 | 3,977,356 |
| 114–210 | 3,977,448 |
| 272–131 | 3,977,676 |
| 293–069 R | 3,977,713 |
| 096–001 M | 3,977,780 |
| 062–135 | 3,977,851 |
| 062–402 | 3,977,852 |
| 062–491 | 3,977,853 |
| 427–213 | 3,977,896 |
| 526–260 | 3,978,029 |
| 526–247 | 3,978,030 |
| 526–352 | 3,978,031 |
| 526–344 | 3,978,032 |
| 526–001 | 3,978,033 |
| 536–004 | 3,978,041 |
| 536–023 | 3,978,042 |
| 536–028 | 3,978,043 |
| 536–117 | 3,978,044 |
| 424–270 | 3,978,060 |
| 424–275 | 3,978,081 |

# PATENTS

GRANTED AUGUST 31, 1976

ERRATA



| Pa- | Se- |
|---|---|
| CLASS | PATENT NO. |
| 092-012 | 3,977,805 |
| 015-104.17 | 3,977,817 |
| 125-140 R | 3,977,843 |
| 115-033 | 3,977,836 |
| 114-210 | 3,977,358 |
| 175-174 | 3,977,774 |
| 201-069 R | 3,977,787 |
| 096-001 M | 3,977,780 |
| 092-102 | 3,977,851 |
| 092-103 | 3,977,852 |
| 062-191 | 3,977,833 |
| 427-213 | 3,977,856 |
| 250-492 | 3,978,000 |
| 250-372 | 3,978,101 |
| 250-364 | 3,978,022 |
| 250-001 | 3,978,023 |
| 250-004 | 3,978,041 |
| 250-023 | 3,978,043 |
| 250-028 | 3,978,045 |
| 250-177 | 3,978,044 |
| 424-270 | 3,978,200 |
| 424-273 | 3,978,201 |

# PATENTS

## GRANTED AUGUST 31, 1976

## GENERAL AND MECHANICAL

**3,977,025**

### BELT CLOSURE FOR STERILE BACK SURGICAL GOWN OR THE LIKE

**Robert T. Horan, Tucson, Ariz., assignor to Will Ross, Inc., Milwaukee, Wis.**

**Filed Dec. 24, 1975, Ser. No. 644,045**

**Int. Cl.² A41D *13/00***

**U.S. Cl. 2—114** **9 Claims**

**1.** In a belt closure for a surgical gown or the like of the type in which there is a vertical back opening line, an inner back panel with a free edge parallel to the opening line, a closure panel having an open position wherein it is folded back on itself along a fold line parallel to the opening line with its free vertical edge toward one side of the gown, the closure panel being movable to an unfolded closed position wherein it extends across the opening line and overlaps the inner back panel with its free edge toward the other side of the gown, a first belt having a fixed end attached to the gown and a free end, and a back belt that is tyable to the first belt and has a fixed end and a free end

the improvement wherein: there is a pocket on the closure panel that has an open end; and the fixed end of the back belt is attached to the closure panel in the area covered by the pocket, the back belt being withdrawably stored in the pocket with only its free end protruding from the open end; and there is an open-ended protective envelope removably covering the free end of the back belt.

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**3,977,026**

### BONE PROSTHESIS MADE OF SINTERED ALUMINA

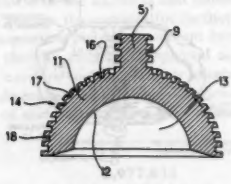
**André Battault, Bazet, France, assignor to Ceraver, France**

**Filed May 29, 1975, Ser. No. 581,737**

**Claims priority, application France, May 29, 1974, 74.18588**

**Int. Cl.² A61F *1/24***

**U.S. Cl. 3—1.91** **15 Claims**



**1.** In a prosthesis device intended for replacing a bone joint and comprising two parts, one part for connecting to one bone and the other part for connecting to another bone, said one part having a spherical internal surface and a spherical external surface, said one part having an axis lying along a diameter of the sphere defining said spherical external surface, said spherical external surface defining a plurality of grooves arranged in planes perpendicular to said axis, said another part having a spherical external surface for mating with the spherical internal surface of said one part, the improvement wherein the groove walls of at least some of the grooves in the spherical external surface of said one part lie in cones, the apexes of said cones intersecting said axis.

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**3,977,027**

### WATER CURRENT-PRODUCING APPARATUS

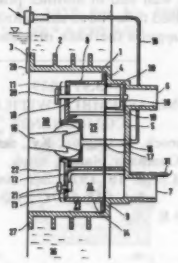
**Willy Speck, Am Neubruch 27, D-8501 Behringersdorf, Germany**

**Continuation-in-part of Ser. No. 279,073, Aug. 9, 1972, abandoned. This application May 20, 1974, Ser. No. 471,791**

**Claims priority, application Germany, Feb. 25, 1972, 2209056**

**Int. Cl.² E04H *3/18***

**U.S. Cl. 4—172.16** **11 Claims**

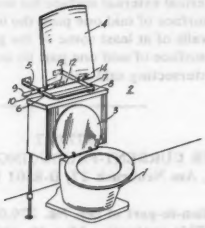


**1.** An apparatus for producing a water current in a swimming pool which comprises an outer housing which is adapted to be mounted in the wall of a swimming pool, said outer housing being provided with a suction nipple and a pressure nipple, a housing insert disposed within the outer housing, said housing insert having a side wall which defines an annular intake space between the outer housing and the interior of the housing insert, partition means associated with the housing insert, said partition means subdividing the interior of said housing insert into a pressure chamber and a suction chamber having a front side and lateral side, a pump means having a pressure side and a suction side which communicates with the pressure chamber and the suction chamber, respectively, said pressure chamber containing a front wall, at least one nozzle means disposed in said front wall, said suction chamber containing open sections in the lateral side thereof, said pressure chamber being disposed between the pressure nipple and the nozzle means, said suction chamber being disposed between the suction nipple and the annular intake space, said annular intake space communicating with the interior of the swimming pool and the suction chamber by means of an intake opening disposed in the side wall of the suction chamber, the throughflow cross section of the intake opening being sufficiently large to produce a low velocity in the intake flow so that no significant suction power exists.

## 3,977,028
## TOILET ACCESSORY

Henry C. Chang, 625 Hurlingham Ave., San Mateo, Calif. 94402

Filed May 14, 1975, Ser. No. 577,391
Int. Cl.² E03D 11/00
U.S. Cl. 4—254 2 Claims



1. A toilet accessory for a toilet in proximity with a wall behind it and having a lid, said toilet accessory comprising

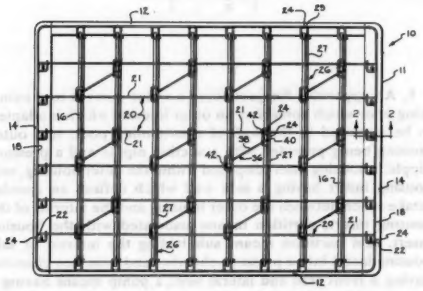
a back rest; and

support means movably supporting the back rest on a wall behind the toilet in a manner whereby in one position the back rest is above the toilet and free therefrom and rests against the wall and in another position the back rest is over the raised toilet lid in substantial juxtaposition therewith and supports the back of a user of the toilet.

## 3,977,029
## BOX SPRING ASSEMBLY WITH COATED WIRE COMPONENTS

William L. Hancock, Lexington, Ky., assignor to Hoover Ball and Bearing Company, Saline, Mich.

Filed Sept. 18, 1974, Ser. No. 506,946
Int. Cl.² A47C 23/04
U.S. Cl. 5—259 R 3 Claims

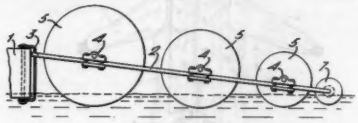


1. In a box spring assembly which includes a generally rectangular support frame having a pair of end rails and a pair of side rails, a plurality of main wire springs mounted on said frame, said main springs including a plurality of longitudinal springs generally parallel to said side rails and a plurality of transverse springs generally parallel to said end rails, each of said main springs having a substantially straight body section and depending resilient end portions supported on said frame, a plurality of internal support springs supported on said frame, each of said support springs extending between a pair of said main springs, each of said internal support springs having end sections arranged parallel to and side-by-side with the body sections of a pair of said main springs, said last mentioned body sections having a coating thereon formed of a yieldable material, and clip members tightly encircling said side-by-side sections and urging said sections toward each other into frictional engagement with each other so as to securely connect said sections, said clips biting into said coating so as to preclude movement of said side-by-side sections relative to each other and relative to said clips.

## 3,977,030
## ARRANGEMENT FOR HAULING UP, LAUNCHING AND STORING OF BOATS AND THE LIKE

Lars Ringdal, Montebellovelen 15, Oslo 3, Norway

Filed Jan. 13, 1975, Ser. No. 540,541
Int. Cl.² B63B 23/00
U.S. Cl. 9—41 12 Claims

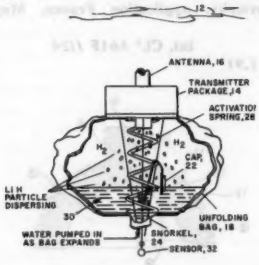


1. A device of the type disclosed for hauling up, storing, or launching boats or the like at a base means comprising a frame; means securing said frame to said base means; said securing means including means permitting relative vertical movement between said base means and said frame; buoyancy elements rotatably mounted on said frame; said frame extending outwardly from said base means over a body of water with at least one of said buoyancy elements floating in said body of water; said at least one buoyancy element partially supporting said frame from said body of water during haul up and launching of a boat while said frame is secured by said securing means to said base means; said at least one buoyancy element directly engaging, at least partially supporting from said body of water, and rollingly guiding a boat hull during haul up and launching of a boat while simultaneously at least partially supporting said frame as aforesaid; and movement of said boat on said buoyancy elements during haul up and launching causing rotation of said at least one element floating in water.

## 3,977,031
## INFLATION SYSTEM

Roger I. Saunders, Hollis, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Feb. 28, 1975, Ser. No. 554,254
Int. Cl.² B63C 9/18
U.S. Cl. 9—323 20 Claims




1. An inflation system for waterborne apparatus comprising:

an expandable container for supporting said apparatus, said container having an orifice,

means for orienting said waterborne apparatus to an upright position in the water,

spring biased means for expanding said container when said container is immersed in water thereby to ingest water

into said container through said orifice to produce a body of water within the container having a top surface,

a supply of material located above said body of water which reacts with water to form a gas, said material being in finely divided form, and

means coacting with said spring biased means for dispensing said finely divided material from said location above said body of water to said top surface of the ingested water, thereby to cause rapid inflation of said container.

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**3,977,032**

## SCREW-THREADED CUTTING DIEHEADS

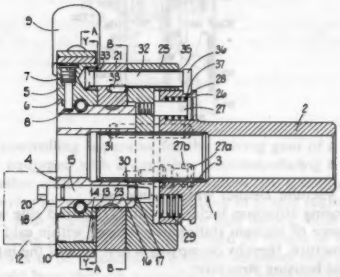
**Denis Alfred Newell, Coventry; Kenneth Atkins, Bulkington nr. Nuneaton, and Brian Dudley Harper, Coventry, all of England, assignors to Alfred Herbert Limited, Coventry, England**

**Filed Apr. 17, 1975, Ser. No. 568,894**

**Claims priority, application United Kingdom, Apr. 27, 1974, 18543/74**

**Int. Cl.² B23G *1/28, 5/12***

**U.S. Cl. 10—96 R** **14 Claims**



1. A diehead for cutting screw threads comprising a body, means for mounting a plurality of thread chaser carriers for pivotal movement relative to the body about respective spaced parallel axes, means for displacing the mounted carriers angularly about the longitudinal axis of the diehead, means engaged with the mounted carriers to cause said carrier pivotal movement in response to angular displacement of the carriers, constraint means for normally constraining the carrier pivotal movement within a range defined by carrier operative and inoperative positions, pivotally mounted locking means engaged and pivotable with the mounted carriers, and formations respectively on the locking means and carriers which are arranged for interengagement during pivotal movement of the carriers within said range of movement to prevent axial withdrawal of the carriers, said constraint means being operable to release the carriers for further angular displacement and responsive pivotal movement beyond said range of movement, thereby causing the pivotal axes of the locking means and carriers to be relatively displaced to an extent permitting disengagement of said formations and thus axial withdrawal of said carriers from the diehead.

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**3,977,033**

## MOLDING BANDS

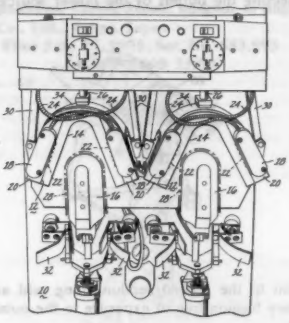
**William Tabroff, Peabody, Mass., assignor to USM Corporation, Boston, Mass.**

**Filed July 23, 1975, Ser. No. 598,233**

**Int. Cl.² A43D *11/00***

**U.S. Cl. 12—54.3** **6 Claims**

1. A flexible band for use in heating and pressing an end portion of a shoe upper to facilitate conforming said end portion to the shape of a form, said flexible band comprising a generally U-shaped main portion having enclosed therein a



random array of metal particles to aid in heat transfer through said band.

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**3,977,034**

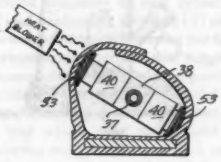
## METHOD AND APPARATUS FOR FORM FITTING SHOES AND BOOTS

**Dennis N. Brown, 8528 Custer School Road, Custer, Wash. 98240**

**Filed Mar. 21, 1975, Ser. No. 560,740**

**Int. Cl.² A43D *9/00***

**U.S. Cl. 12—142 R** **1 Claim**



1. A method of locally shaping foot gear by outward expansion of a local portion of the foot gear including the step of inserting a fluid pressure expansible member into the foot gear with one movable end engaged against the area to be expanded and the opposite end engaged against a portion of the foot gear opposite the area to be expanded, applying heat to the outer surface only of the area to be expanded, applying fluid pressure to the expansible member to expand the area to be expanded and permitting the foot gear to cool while maintaining the expansion of the expansible member.

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**3,977,035**

## PIVOTED DRIVE AND MOUNT FOR MEAT SCRAPING MACHINE

**Herbert R. Crane, Tipp City, Ohio, assignor to Hobart Corporation, Troy, Ohio**

**Filed Dec. 20, 1974, Ser. No. 535,037**

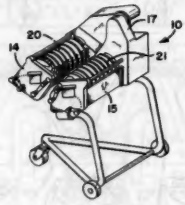
**Int. Cl.² A22C *17/08***

**U.S. Cl. 15—3.17** **11 Claims**

1. In a power driven meat scraping machine for cleaning accumulated residue from the sawed faces of a piece of meat, the machine including a first section for cleaning one side of the meat, a second section mounted relative to the first section for cleaning the other side of the meat, and at least one rotational power source located in the first section, the improvement comprising:

a. means having a rotational axis and mounting the first and second sections for pivoted rotational movement relative to one another about said axis, and

b. power drive connecting means coaxial with and wholly contained within said mounting means for mechanically connecting the output of the power source in the first




section to the second section along said axis and in a sanitary fashion free of exposure to the outside environment.

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**3,977,036**

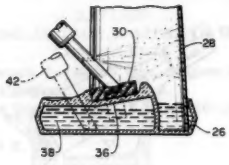
## SOLDERING IRON HOLDER AND CLEANING RECEPTACLE

**Louis Vanyi, 246 Crestwood Ave., Ventura, Calif. 93003**

**Division of Ser. No. 457,284, April 2, 1974, Pat. No. 3,917,147. This application July 28, 1975, Ser. No. 599,759**

**Int. Cl.[2] B05C *11/105*; B23K *3/02***

**U.S. Cl. 15—118** **8 Claims**




1. A soldering iron holder and cleaning receptacle comprising:

a. a base having first and second reservoirs;

b. said first reservoir being substantially open and containing water;

c. said second reservoir being substantially closed and containing a liquid means which protects the soldering tip from oxidation, lubricates the tip and helps prevent accumulation of carbonized flux, and drains excess heat from and stabilizes the temperature of the soldering tip without need for additional heat control;

d. an access hole to said second reservoir adapted to support a soldering iron so that said liquid means makes direct contact with the soldering tip and completely surrounds it;

e. a platform on said base adjacent to said access hole rising above said first reservoir;

f. a water-absorbent material supported on said platform;

g. means communicating with the water in the first reservoir for keeping the water-absorbent material moistened; and

h. a chamber means proximate to said plateform for collecting solder expelled from a solder expulsion port of a capillary type soldering tip which stores solder by capillary action, thus permitting the collected solder to be recycled; said water-absorbent material operating to provide water vapor pressure to capillary passageways in the soldering tip for purging solder and debris therefrom when the hot working end of the tip is pressed down on the moistened water-absorbent material.

**3,977,037**

## VACUUM CLEANER

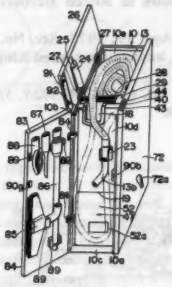
**Yuji Miyake, Himeji; Hideo Kashihara, Kasai; Kazuyoshi Takahashi, Hyogo; Takamitu Yamamoto, and Takuya Morishita, both of Kasai, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan**

**Filed Sept. 19, 1974, Ser. No. 507,590**

**Claims priority, application Japan, Oct. 15, 1973, 48-11933U; Oct. 16, 1973, 48-120548U; June 11, 1974, 49-68272[U]**

**Int. Cl.[2] A47L *9/00***

**U.S. Cl. 15—315** **17 Claims**




1. A vacuum cleaner which comprises:

a housing structure including front, rear and side walls;

a source of vacuum stationarily housed within said housing structure, thereby occupying a first area of the interior of said housing structure;

a removable dust collector removably accommodated within said housing structure, thereby occupying a second area of the interior of said housing structure adjacent said first area thereof, said collector being, when held in position within said second area, operatively coupled to said vacuum source;

a flexible vacuum hose having an inner end removably coupled to said dust collector and an outer end situated outside said housing structure, a substantially intermediate portion of which flexible vacuum hose is adapted to be accommodated within said housing structure thereby occupying a third area of the interior of said housing structure immediately above said first and second areas;

an opening formed in one of said side walls of said housing structure and through which said flexible hose loosely extends;

an automatic drawing mechanism for drawing back into said third area, a length of said flexible hose that has been extended outside said third area and out of said housing structure for use, said automatic drawing mechanism including a pair of rolls parallely spaced a distance slightly smaller than the outer diameter of the flexible hose, said flexible hose being operatively sandwiched between said rolls, and a drive unit for driving at least one of said rolls for automatically drawing said flexible hose back into said third area in cooperation with the other roll when said drive unit is operated; and

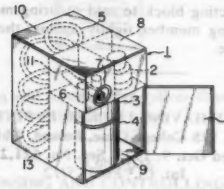
a hingedly supported top lid for selectively opening and closing an opening at the top of said housing structure, said opening in said side wall opening at the opening at the top of said housing structure thereby to facilitate takeout of said flexible hose from said third area in readiness for a cleaning job, said other roll being rotatably mounted to said top lid in such a manner as to face towards said one of said rolls.

3,977,038

## CONTROLLING APPARATUS FOR DRIVING GEAR IN SUCTION CLEANER

Hiroshi Hukuba, Nagareyama; Iwao Ikegami, and Teruaki Yasuda, both of Tokyo, all of Japan, assignors to Hiroshi Hukuba, Nagareyama, Japan

Filed May 21, 1975, Ser. No. 579,491
Claims priority, application Japan, May 25, 1974, 49-58925
Int. Cl.² A47L 9/28
U.S. Cl. 15—339 4 Claims




1. A controlling apparatus for the driving gear of a suction cleaner equipped with a container accommodating a suction fan together with a motor for said suction fan, a suction hose, and a device for paying-out and hauling-in of said suction hose together with a reversible motor for said device, both of said motors being supposed to be controlled by means of controlling circuits to be actuated by a switch disposed near the fore end of said hose through a couple of lead wires buried in the hose, wherein said two motors are to be actuated by alternating current, said controlling circuits (31, 31') for these motors are respectively provided with a relay (R1) for actuating the motor (33), relays (R2 and R3) for normal and reverse rotations of the motor (34) and three switches (S1, S2 and S3) constituting the foregoing switch for actuating these relays (R1, R2 and R3), optional two circuits among the first circuit comprising said relay (R1) and switch (S1), second circuit comprising said relay (R2) and switch (S2) and third circuit comprising said relay (R3) and switch (S3) are respectively provided with AC half-wave rectifiers having opposite polarities while the remaining one circuit is provided with contacts to be controlled by two relays included in said two circuits provided with said rectifiers.

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3,977,039

## AIR BLAST SWEEPER WITH DUST CONTROL SYSTEM

Thomas S. Block, Muskegon, Mich., assignor to Clarke-Gravely Corporation, Muskegon, Mich.

Filed Feb. 5, 1975, Ser. No. 547,224
Int. Cl.² A47L 5/14, 9/00, 9/18
U.S. Cl. 15—346 16 Claims

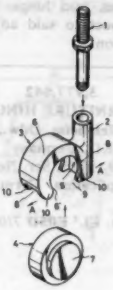
10. An air blast-type sweeper comprising:
an air blast pickup head including intake and outlet ports;
blower means including an exhaust outlet coupled to said intake port of said pickup head and an inlet;
a debris collection chamber having an input coupled to said outlet port of said pickup head and an outlet coupled to said inlet of said blower; and
means for supplying a fine mist spray of wetting agent to the air flow path between said blower and said pickup head and to the air flow path between said pickup head and said debris plenum.

3,977,040

## CASTOR

Michio Sugasawara, Tokyo, Japan, assignor to Sugatsune Industrial Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,593
Int. Cl.² B60B 33/00
U.S. Cl. 16—45 2 Claims



1. A castor for an article comprising:
a. a connecting member (1) connected to said article and having a cylindrical connecting portion at the lower side thereof;
b. a wheel having a shaft projecting from each side thereof; and,
c. a main body (3) having generally tubular portion (2) at one end fitted rotatably to said cylindrical connecting portion of said connecting member (1) and an arc-shaped wheel-accommodating-and-bearing portion (6) in excess of 180° extent connected to said tubular portion; said wheel-accommodating-and-bearing portion (6) having a pair of arc-shaped side walls (6') spaced a predetermined distance apart forming a recess therebetween for accommodating said wheel, said arc-shaped side walls (6') forming bearing recesses for receiving said shafts of said wheel and having resilient portions (10) at the lower ends thereof for preventing slip-off of said wheel, and said resilient portions (10) extending up to a position slightly lower than the upper half of said wheel placed in position.

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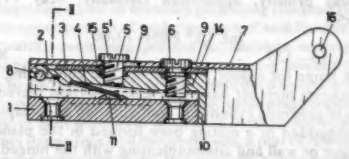
3,977,041

## HINGE DEVICE

Erich Röck, Hochst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Blum Gesellschaft m.b.H., Hochst, Austria

Filed Dec. 19, 1974, Ser. No. 534,346
Claims priority, application Austria, Dec. 31, 1973, 10906/73
Int. Cl.² E05D 7/04
U.S. Cl. 16—129 9 Claims




1. A hinge device, particularly for mounting a door to a piece of furniture, said device comprising:
a mounting plate adapted to be attached to a piece of furniture, said mounting plate having recesses along opposite sides thereof;

an intermediate part positioned on the top of said mounting plate, said intermediate part having projections received in said recesses, said intermediate part being fixed with respect to said mounting plate;

an adjustment part positioned on the top of said intermediate part and adjustably movable toward and away therefrom; and

a hinge arm adjustably connected to said adjustment part and having a substantially U-shaped lateral cross-sectional configuration, said hinge arm being adjustably movable with respect to said adjustment part in said longitudinal direction.

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**3,977,042**

**FURNITURE HINGE**

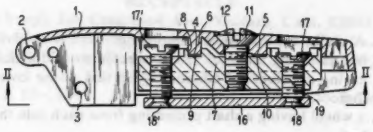
**Karl Lautenschlaeger, Reinheim, Odw., Germany, assignor to Karl Lautenschlager KG, Germany**

**Filed Jan. 9, 1975, Ser. No. 539,648**

**Claims priority, application Germany, Jan. 16, 1974, 2401865**

**Int. Cl.² E05D *7/04***

**U.S. Cl. 16—130** **12 Claims**



1. A furniture hinge for attachment to a carrier wall of a piece of furniture comprising:

an elongated upper carrier arm portion adapted to carry a hinge joint;

an elongated lower carrier arm portion adapted for attachment to a mounting plate which in turn is adapted to be secured to said carrier wall;

means for adjustably securing said upper and lower carrier arm portions to each other so that said upper and lower carrier arm portions may be moved transversely relative to each other; and

cooperating means on each of said upper and lower carrier arm portions allowing selective adjustability of said upper carrier arm portion with respect to said lower carrier arm portion,

said cooperating means comprising cooperating tongue and groove means formed on said upper and lower carrier arm portions and cooperating serrated surfaces formed on and extending transversely to said tongue and groove means to effect a secure positioning of the tongue portion with respect to the groove portion.

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**3,977,043**

**FURNITURE HINGE**

**Ernst Zernig, Muhlenweg 29, 587 Hemer, Germany**

**Filed May 17, 1974, Ser. No. 471,112**

**Claims priority, application Germany, May 17, 1973, 2325057**

**Int. Cl.² E05D *11/00***

**U.S. Cl. 16—137** **8 Claims**

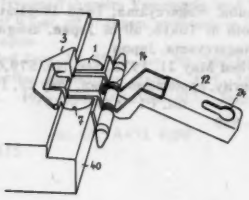
1. A hinge for a door, wall, or the like comprising:

a securing member having at least a portion thereof which is of generally cylindrical configuration and adapted to be embedded in a mating bore formed in the plane of the door or wall and communicating with the hinged edge of the door or wall,

a connecting block for pivotally supporting said hinge means,

a recess in said securing member extending from an edge thereof radially inwardly for slidably receiving said connecting block,

means for securing said connecting block to said securing member,



and further means effective in response to the securing of said connecting block to said securing member to urge said securing member tightly against the walls of said mating bore.

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**3,977,044**

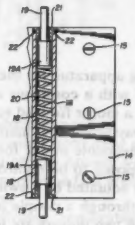
**HINGE HAVING LOCKED IN PINTLES**

**Edgar A. Mort, 128 College Lane, Poland, Ohio 44514**

**Filed Oct. 9, 1975, Ser. No. 621,228**

**Int. Cl.² E05D *5/12***

**U.S. Cl. 16—169** **4 Claims**



1. In a door hinge comprising a hinge plate and a door jamb, knuckles on said hinge plate and door jamb, said knuckles being offset from the planes of the hinge plate and the door jamb, cutaway areas in the knuckle on the door jamb for the reception of the knuckle on the hinge plate, a pair of oppositely disposed pintles, each slidably extending through an end of the bore in said knuckle on the hinge plate, a spring between said pintles urging them apart; each of said pintles having adjacent portions of different large and small diameters, oppositely disposed flanged bushings positioned with a press fit securely within the opposite ends of the knuckle bore on the hinge plate and defining passageways in which the portions of said pintles having said smaller diameters are slidable, said flanged bushings arranged to retain the portions of the pintles having the larger diameters within said knuckle on said hinge plate and provide wearing surfaces therefor.

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**3,977,045**

**STATIC CHARGE POSITIONING OF TEXTILE SLIVER IN ANGLED TUBULAR FEEDER**

**Donald G Saurenman, 6787 Worsham Drive, Whittier, Calif. 90602**

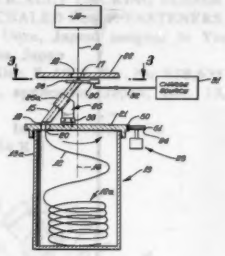
**Filed Dec. 6, 1974, Ser. No. 530,196**

**Int. Cl.² B65H *54/80***

**U.S. Cl. 19—159 R** **5 Claims**

1. In the method of feeding a textile sliver into a drum to coil therein, and wherein the sliver is fed through a tube, the tube and drum relatively rotated about an axis, the tube extending at an angle to said axis to deliver the sliver to coil within the drum, the sliver entering the tube having a static electrical charge of determinable polarity, said method including the steps

a. imparting to the tube inner wall a sufficient static charge of a polarity the same as said charge on the sliver thereby to effect a repulsion of the sliver from said inner wall as the sliver travels completely through the tube, and



b. continuing said feeding of the sliver through said tube as the tube rotates about said axis.

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**3,977,046**

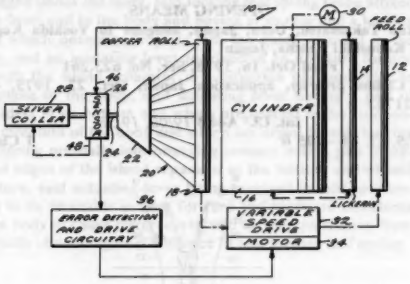
**DENSITY SENSING AND CONTROLLING EQUIPMENT**

**Cecil S. Wise, Dallas, N.C., assignor to Fiber Controls Corporation, Gastonia, N.C.**

**Filed May 31, 1974, Ser. No. 475,312**

**Int. Cl.² D01H *5/38***

**U.S. Cl. 19—240** **9 Claims**




1. A textile processing machine having a sliver density sensing and control apparatus comprising:

speed variable feeding means for receiving and feeding fibers to be processed by said machine, means for producing sliver including doffing means operable at a given speed and spaced from said feeding means, and means between said feeding and doffing means for processingly operating on fibers received from said feeding means within a predetermined processing time between the time fibers are fed by said feeding means and doffed by said doffing means,

variable speed driving means between said doffing and feeding means for controlling the speed of the fiber feeding means relative to the speed of said doffing means,

means connected to said machine and operative on said produced sliver for sensing variations in the effective relative density thereof for producing an electrical signal related to said variations from a predetermined norm, and

circuitry operatively related to said driving means, said circuitry including: a voltage source, a timer-controlled switch, timer means operative independently to said electrical signal for cyclically moving said timer-controlled switch between open and closed positions, and additional switching means responsive to the sense of said electrical signal for completing a circuit from the voltage source through the timer-controlled switch, when said switch is in its closed position, to said driving means thereby actuating the driving means to return and sliver density back towards the predetermined norm.

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**3,977,047**

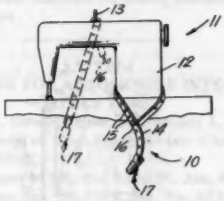
**DRESSMAKER'S ATTACHMENT**

**Sabray J. Lege, 1005 Thomas St., Abbeville, La. 70510**

**Filed Dec. 4, 1974, Ser. No. 529,563**

**Int. Cl.² A44B *21/00*; D05B *35/00***

**U.S. Cl. 24—73 AS** **3 Claims**



1. A dressmaker's attachment comprising an elongate flexible strap having a single row of spaced apart apertures formed therein, a single hook formed from a single piece of metal bent into a half circle secured to one end of said strap and extending longitudinally beyond the center of the end thereof, and a resilient clamp secured to the center of the opposite end of said strap for releasably clamping material therein, said hook being adapted to engage in a selected one of said apertures to form a support encompassing loop.

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**3,977,048**

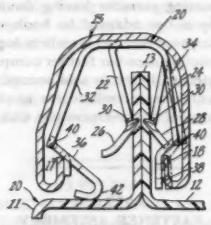
**MOLDING CLIPS**

**Edward R. Benedetti, Mount Clemens, Mich., assignor to USM Corporation, Boston, Mass.**

**Filed Sept. 15, 1975, Ser. No. 613,247**

**Int. Cl.² A44B *21/00*; E04F *19/02***

**U.S. Cl. 24—73 FT** **5 Claims**



1. In combination with a C-shaped molding to be attached to a panel having an upstanding flange thereon, a U-shaped clip comprising a pair of inwardly projecting flanges extending from the upper portion of said clip, each of said flanges having an outwardly projecting portion to facilitate receiving the upstanding panel flange therebetween during assembly of the clip on to the panel, each of said inwardly projecting flanges further comprising a pair of inwardly extending prongs at the juncture of said outwardly projecting portion for biting into said panel flange received therebetween, a pair of resilient legs extending downwardly from the said clip upper portion and each respectively spaced outwardly from said clip flanges, each of said legs having a tab formed to extend inwardly toward said panel flange and a pair of tangs on each of said legs extending outwardly from the juncture of said leg and said tab to contact the inner surface of the C-shaped molding when

assembled on said clip and inhibit removal of the molding from said clip.

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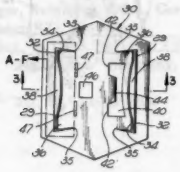
**3,977,049**

## BELT BUCKLE

**Eugene Mezereny, and Ilona C. Mezereny, both of 509 Indiana Court, South Pasadena, Calif. 91030**

**Continuation of Ser. No. 153,967, June 17, 1971, abandoned.**
**This application Aug. 20, 1973, Ser. No. 389,478**
**Int. Cl.² A44B *11/25***
**U.S. Cl. 24—77 R** **4 Claims**



**1.** A belt buckle having two parts adapted to be secured to opposite ends of a belt, comprising:

an outer buckle member comprising an outer frame and a plurality of innerplates removably attachable to said outer frame, adjacent edges of said outer frame and innerplates providing between them two parallel longitudinal slots adjacent opposite ends of said outer member, each of said plates having a different width thereby providing different slot widths when attached to said frame, said outer frame further comprising:

a first aperture between said slots having a tongue protruding into said aperture, the sides of said aperture forming shoulders on opposite sides of said tongue;

a second aperture adjacent to said first aperture;

an inner connecting member having double short hooks connected by a bar adapted to hook onto said outer member to connect the two members together

said inner connecting member further comprising a projecting lug adapted to lodge in said second aperture when said outer and inner members are hooked together to prevent rotation of the two members with respect to each other.

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**3,977,050**

## FASTENER ASSEMBLY

**Abel Macias Perez, Mexico City, Mexico, assignor to Monarch Marking Systems, Inc., Dayton, Ohio**

**Filed Jan. 20, 1975, Ser. No. 542,140**
**Claims priority, application Mexico, Apr. 19, 1974, 150718**
**Int. Cl.² A44B *9/00***
**U.S. Cl. 24—150 FP** **12 Claims**

**1.** A one-piece injection molded fastener assembly adapted to be dispensed by a tag attacher, comprising; a plurality of fasteners each having a crossbar, a head, and a filament joining the crossbar and the head, a rod spaced from the crossbars, and a separate connector connecting each crossbar and the rod, the crossbars being molded parallel with respect to each other and perpendicular with respect to the rod, wherein the fastener assembly is composed of injection-moldable polymer composition comprised of a moldable nylon containing a minor amount, between about 1% to about 25% by weight of the moldable polymer composition, of a polyester selected from the group consisting of film and fiber forming polyesters the amount of polyester being an amount which increases the tendency of the crossbars to remain parallel to each other and

perpendicular to the rod after removal of the fastener assembly from the mold.

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**3,977,051**

## REUSABLE SLIDE FASTENER WITH EMERGENCY OPENING MEANS

**Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan**

**Filed Oct. 16, 1975, Ser. No. 623,261**
**Claims priority, application Japan, Oct. 22, 1975, 49-121743**
**Int. Cl.² A44B *19/00, 19/38***
**U.S. Cl. 24—205 R** **1 Claim**

**1.** In a slide fastener which includes a pair of stringers having interengageable rows of fastener elements carried thereby, said rows of fastener elements having an emergency opening zone which is located intermediate both ends thereof and which is adapted to permit the slide fastener to be forced open in emergencies without pulling a slider along the rows of fastener elements, the combination thereof with a slider escape mechanism at one end of the slide fastener for causing the slider to ride on only one of the stringers by releasing the other stringer after the slide fastener has been forced open from the emergency opening zone, and a connect-disconnect terminal mechanism at the other end of the slide fastener for

connecting and disconnecting the stringers while the rows of fastener elements are disengaged from each other.

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3,977,052

## AUTOMATICALLY LOCKING SLIDER FOR CONCEALED SLIDE FASTENERS

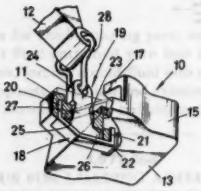
Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Dec. 8, 1975, Ser. No. 638,635

Claims priority, application Japan, Dec. 13, 1974, 49-152124[U]

Int. Cl.² A44B 19/30

U.S. Cl. 24—205.14 R 2 Claims




1. In a slider for a concealed slide fastener which includes a body having an island separator at its front end, said island separator cooperating with said body to define a generally Y-shaped guide channel through the latter, an automatic lock mechanism comprising, in combination, a locking leaf spring arranged under the body, said locking leaf spring being affixed at its front end to the body and having at its rear end a locking pawl which normally projects into the guide channel in the body, and an acutating lever received in an aperture formed through the island separator in a direction perpendicular to the plane of the body, said actuating lever having a pair of shoulders at its bottom end which are spaced in the front-to-rear direction of the body and which are urged by said locking leaf spring normally into engaging contact with a pair of opposed edges of the island separator at the bottom end of said aperture, said actuating lever being received in said aperture so as to be pivotable in both forward and rearward directions of the body to cause retraction of said locking pawl away from the guide channel against the force of said locking leaf spring.

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3,977,053

## SLIDE FASTENER STRINGER

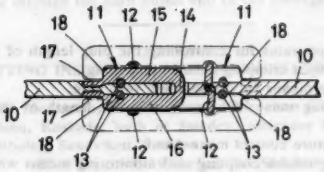
Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Sept. 24, 1974, Ser. No. 508,882

Claims priority, application Japan, Oct. 20, 1973, 48-121824[U]

Int. Cl.² A44B 9/40

U.S. Cl. 24—205.16 R 2 Claims




1. In a slide fastener having a pair of opposed stringer tapes each bearing a row of fastener elements and a slider moveable along such rows of fastener elements to put same into and out of interengagement, the improvement which comprises each of said fastener elements including a coupling head at its front end and a pair of substantially parallel spaced legs extending rearwardly from said coupling head, flattened portions formed at the rear ends of said legs of each of said fastener elements to provide slideways for a slider, said flattened portions being buried into said stringer tape from both surfaces thereof to such an extent that the outer surfaces of the respective flattened portions are in substantially coplanar relationship to corresponding surfaces of said stringer tape adjacent said flattened portions, and steps formed between said flattened portions of the respective legs of each of said fastener elements and the remaining portions thereof, and marginal flanges on said slider disposed for sliding contact engagement with said slideways.

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3,977,054

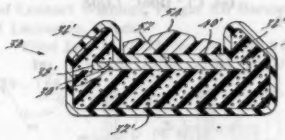
## STRAP FITTING FOR AUTOMOBILE INTERIOR AND OTHER USES

Ronald D. Moore, Grosse Pointe, and Everett L. Bethel, Sterling Heights, both of Mich., assignors to Chivas Products Ltd., Warren, Mich.

Continuation-in-part of Ser. No. 538,538, Jan. 6, 1975. This application Jan. 30, 1976, Ser. No. 653,668

Int. Cl.² A47B 95/02; A45C 13/26

U.S. Cl. 24—265 R 29 Claims



1. A strap comprising:

an elongated base strip, said base strip having ends adapted for securing said strap to a surface;

cushioning means, said cushioning means being shorter than said base strip and imparting a soft, padded feeling to said strap;

a facing strip, said facing strip being wrapped around and retaining said base strip and said cushion strip in an engaging relationship, being of a length intermediate that of said base strip and said cushioning member, and having adjacent opposed longitudinal edges on one side of said base strip;

a trim strip disposed over and concealing said opposed longitudinal edges of said facing strip, secured to said facing strip and of a length approximately equal to said facing strip.

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3,977,055

## PILE FABRIC LOOP CUTTING APPARATUS

Michael William Gilpatrick, Chesnee, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Jan. 20, 1975, Ser. No. 542,111

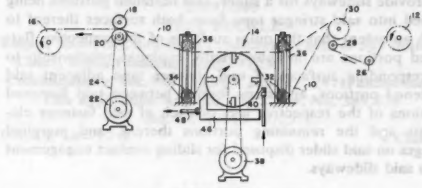
Int. Cl.² D06C 13/08

U.S. Cl. 26—9 6 Claims

1. Apparatus to provide a cut loop pile product comprising: a rotor, said rotor having a plurality of rows of notches therein, means to rotate said rotor, a plurality of modules mounted in each of said notches, a plurality of cutting blades and a plurality of blade guards mounted on each of said modules and projecting outwardly therefrom, said blade guards being longer than said cutting blades to prevent said cutting blades from cutting the backing of a loop pile fabric passed thereover, means to pass the loops of a loop pile fabric having a backing material into contact with the cutting blades in said module and means to take up the loop pile fabric having cut loops.

6. A module for a loop pile fabric cutter comprising: a plurality of upwardly projecting cutting blade members, a

plurality of cutting blade guard members adjacent and between said cutting blade members and projecting upwardly



beyond said cutting blade members and a base member secured to said blade and guard members holding them rigidly in position therein.

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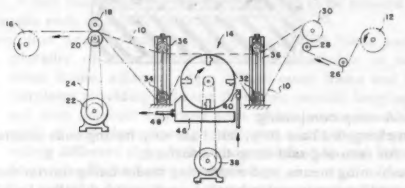
**3,977,056**

## METHOD OF PROVIDING CUT LOOP PILE FABRICS WITH UNCUT SELVEDGE AREAS

**Michael William Gilpatrick, Chesnee, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.**

**Division of Ser. No. 554,739, March 3, 1975, Pat. No. 3,925,864. This application July 14, 1975, Ser. No. 595,468**
**Int. Cl.² D06C *13/08***
**U.S. Cl. 26—9** **1 Claim**



1. The method of providing a cut loop pile fabric on a machine having a rotor across which is mounted a plurality of rows of cutting blade modules with blank modules located on the ends of each row of cutting blade modules comprising the steps of: supplying a web of loop pile fabric having a backing material and selvedge areas without loop pile, rotating the rotor, passing the web of loop pile fabric over the rotor with the main body of the loop pile fabric in contact with the cutting blade modules and the selvedge areas of the fabric in contact with the blank modules to prevent cutting of the selvage areas, cutting the loops in the main body of the loop pile fabric while maintaining the selvedge areas in contact with the blank modules and taking up the cut loop pile fabric.

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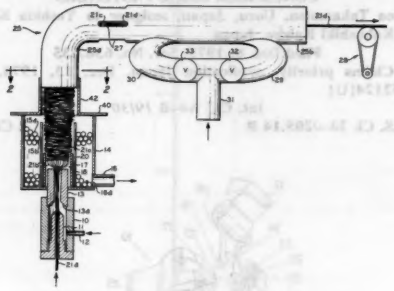
**3,977,057**

## APPARATUS FOR THE PRODUCTION OF YARN

**Miguel A. Fernandez, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jan. 6, 1975, Ser. No. 538,939**
**Int. Cl.² D02G *1/12***
**U.S. Cl. 28—1.6** **8 Claims**

1. Apparatus for the production of yarn comprising:
a chamber in which a yarn wad is formed, said chamber having an inlet and an outlet;
a plurality of stacked members positioned in said chamber, around said yarn and a distance below the outlet of said chamber;
a lid of fixed operating position but removable for string up covering the outlet of said chamber, said lid having an inner surface and an outer surface; and
said inner surface positioned a distance above said stacked members;
first conduit means extending outwardly from the outer surface of said lid, said conduit means having an inlet and



an outlet, said inlet being attached to approximately the center of the outer surface of said lid and in open communication with said chamber.

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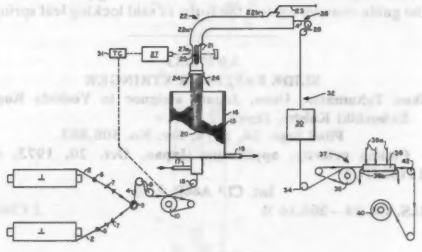
**3,977,058**

## METHOD AND APPARATUS FOR CONTROLLING YARN PLUG LENGTH

**David E. Borenstein, and Richard C. Newton, both of Greenville, S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 363,480, May 24, 1973, Pat. No. 3,886,636. This application Mar. 17, 1975, Ser. No. 559,158**
**Int. Cl.² D02G *1/12***
**U.S. Cl. 28—1.7** **6 Claims**



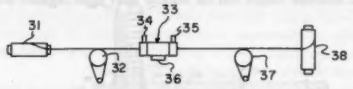
4. An apparatus for controlling the plug length of a yarn produced by a crimping means comprising:
crimping means for producing a yarn plug;
monitoring means for monitoring the length of the yarn plug;
temperature control means; and
coupling means coupling said monitoring means with said control means for controlling the temperature of the yarn upstream of the crimping means, said control means causing the temperature of the yarn to increase when said monitoring means detects a length of yarn plug which is too long and to decrease when the monitoring means detects a length of yarn plug which is too short.

3,977,059

## TEXTILE FLUID CRIMPING PROCESS AND APPARATUS

Fredrick Allen Ethridge; Michael Paul Taylor, and Scott Winfield Thompson, all of Charlotte, N.C., assignors to Fiber Industries, Inc., Charlotte, N.C.

Division of Ser. No. 250,204, May 4, 1972, Pat. No. 3,852,857.
This application Sept. 13, 1974, Ser. No. 505,717
Int. Cl.² D02G 1/20
U.S. Cl. 28—72.11 14 Claims



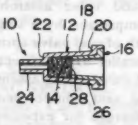

1. A process for fluid crimping yarn, said process comprising forcing hot fluid entrained yarn into a crimping chamber in one direction, forcing a cold fluid into said crimping chamber from an opposite direction and exhausting said fluids from said crimping chamber either radially and/or axially.

3,977,060

## APPARATUS FOR LOADING A MEDICAL NEEDLE HOLDER WITH A FILTER ELEMENT

Soji Ishikawa, Tokyo, Japan, assignor to Ishikawa Manufactory Company, Limited, Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 615,077
Claims priority, application Japan, Sept. 20, 1974, 49-107710
Int. Cl.² B23P 23/00; B01D 27/02
U.S. Cl. 29—33 S 16 Claims




1. Apparatus for loading a generally tubular needle holder with a filter element consisting of a filament yarn of synthetic resin, comprising a passage means having yarn inlet and outlet ends, yarn feed means for conveying a continuous filament yarn of synthetic resin from a yarn supply package and introducing the yarn into said passage means through the yarn inlet end thereof, yarn measuring and cutting means for measuring the length of the conveyed filament yarn and cutting the yarn in a predetermined length in each cycle of operation, needle holder retaining means for holding a needle holder in a predetermined position having an open rearmost end located at the yarn outlet end of said passage means in each cycle of operation, and yarn transfer means for moving the cut segment of the filament yarn into a predetermined transitive position within said passage means and thereafter from the transitive position into the needle holder in said predetermined position thereof through the yarn outlet end of the passage means.

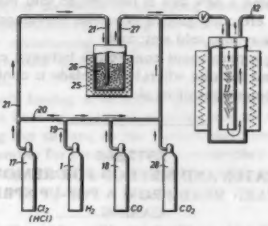
3,977,061

## CUTTING INSERT AND METHOD OF MAKING THE SAME

Jan Nils Lindstrom, Norsborg, and Fall Johan Olof William Ohlsson, Enskede, both of Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden

Filed Sept. 10, 1974, Ser. No. 504,819
Claims priority, application Sweden, Sept. 17, 1973, 7312610
Int. Cl.² B32B 17/06; B23P 15/28; B32B 9/04
U.S. Cl. 29—95 R 2 Claims

1. A cutting insert for chip-forming machining said insert consisting of a sintered substrate of of at least one wear-resisting ceramic oxide or of wear-resisting ceramic oxide mixed with at least one hard carbide or nitride and binder metal, on which substrate is a wear-resisting ceramic oxide surface layer consisting of an oxide from of the group consisting of Al, Zr,



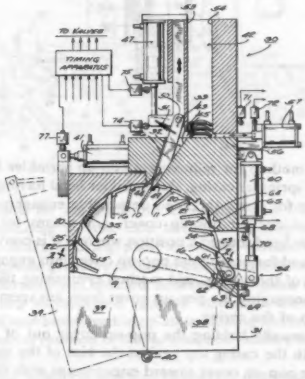

Si, Ca, Mg, Ti and Hf, the surface layer having been deposited from a gaseous phase and having a thickness of 0.5–100 μm, its mean grain size being smaller than 1 μm and essentially smaller than is the mean grain size of the sintered substrate.

3,977,062

## METHOD OF ASSEMBLING BLOWER ROTORS

Knut Olof Lennart Wallman, Fergas AB Harstenagatan 2, S-582 21 Linkoping, Sweden

Filed Jan. 22, 1975, Ser. No. 542,915
Int. Cl.² B23P 15/00, 11/00, 19/04
U.S. Cl. 29—156.8 CF 4 Claims




1. The method of assembling a blower rotor that comprises a sheet metal disc and a plurality of elongated blades which extend lengthwise parallel to the disc axis and which are secured to the disc at locations uniformly spaced around its circumference, which method comprises:

A. forming the disc

1. with a plurality of slots, one for each blade, each said slot opening to the periphery of the disc and being of a shape and size to have a blade inserted edgewise thereinto and of such radial depth that with the blade fully received therein the disc has peripheral portions which are at a greater distance from its axis than the radially outer edge of the blade, and

2. with a plurality of substantially circumferentially facing edge portions, one for each slot, said edge portions extending to the disc periphery and being spaced at equal circumferential distances from one another;

B. so confining the disc, by engaging only its said peripheral portions at circumferentially spaced zones, as to constrain the disc to rotation about its axis;

C. by engaging successive ones of said circumferentially facing edge portions and applying to each a force in the opposite circumferential direction effecting rotational indexing movements of the disc, each of which brings a different one of said slots to a blade inserting station;

D. each time a new slot is brought to said blade inserting station, effecting guided edgewise movement of a blade all the way into said slot; and

E. making a permanent connection between each inserted blade and the disc whereby the blade is confined against displacement out of its slot.

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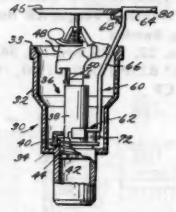
**3,977,063**

## APPARATUS AND METHOD FOR REMOVING A SPRINKLER HEAD FROM A POP-UP SPRINKLER CASING

**Kenneth J. Bruninga, Mapleton, Ill., assignor to L. R. Nelson Corporation, Peoria, Ill.**

**Filed Mar. 17, 1975, Ser. No. 558,626**
**Int. Cl.² B25B *13/48, 27/14***
**U.S. Cl. 29—157 C** **10 Claims**



1. A method for removing a pop-up sprinkler head from a pop-up sprinkler casing, the sprinkler head having a grippable member for screw-threaded detachable engagement with the casing, a circular pop-up cover, and means for biasing the sprinkler head toward a position wherein it is contained by the casing and for biasing the pop-up cover into engagement with the top of the casing, said method comprising the steps of:

a. disengaging the pop-up cover from engagement with the top of the casing,

b. manually holding the pop-up cover out of engagement with the casing top against the bias of the means biasing the pop-up cover toward engagement with the top of the casing,

c. inserting a portion of a tool into the casing and simultaneously positioning a portion of said tool in operative engagement with a bottom surface of said circular pop-up cover, said tool including a gripping means at one end thereof adapted to grasp said grippable member, and a handle member at the other end thereof adapted to be located exteriorly of said casing to be grasped by the hand of an operator, and a lever interconnecting said handle and gripping means, said lever having attached thereto adjacent the handle-engaging end thereof a projecting member having a surface thereof for engaging the bottom surface of said circular pop-up cover, said pop-up cover being automatically held out of engagement with the casing against the bias of the biasing means when said gripping means engages said grippable member and said projecting member surface engages the bottom surface of said pop-up cover,

d. releasing manual hold of the pop-up cover, and

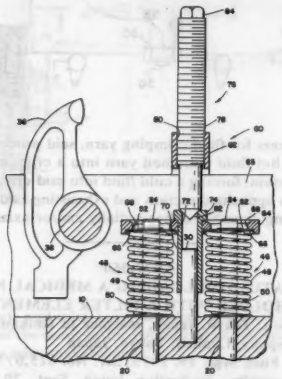
e. detaching the sprinkler head from the casing by effecting rotary movement of the grippable member with said tool.

**3,977,064**

## SITU VALVE SPRING COMPRESSION TOOL

**Charles R. Mote, Columbus, and Willard E. Fleetwood, Valonia, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.**

**Filed Aug. 15, 1975, Ser. No. 605,125**
**Int. Cl.² B23P *19/04***
**U.S. Cl. 29—216** **6 Claims**



1. A tool for in situ compression of a pair of valve spring assemblies positioned in a cylinder head of an internal combustion engine said valve assemblies having upper ends adapted to be compressed by a single input through an element abutting both of said valve spring assemblies and guided for movement parallel to the direction of movement of the upper end of said valve spring assemblies by a pin secured to said cylinder head, said cylinder head having a cover removably connected thereto for exposing said valve spring, said tool comprising:

an elongated support element releasably connectable to said head for bridging the space above said valve spring assembly;

a plate having a recess conforming to and receiving the upper end of said valve spring assembly;

a sleeve telescoped over said pin and connectable with said plate for guiding said plate substantially parallel to the direction of movement of the upper end of said valve spring assembly during compression thereof; and,

an element threadedly engaging said support element and positioned in alignment with said plate for compressing said valve spring assembly in response to rotation of said threaded element.

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**3,977,065**

## CRIMPING MACHINE

**John W. Johnson, Manhattan Beach, Calif., assignor to Wyle Laboratories, El Segundo, Calif.**

**Continuation-in-part of Ser. No. 352,174, March 1, 1973, Pat. No. 3,879,834. This application Jan. 27, 1975, Ser. No. 544,185**
**Int. Cl.² B23P *19/04***
**U.S. Cl. 29—237** **2 Claims**

1. A crimping machine comprising:

an inner cylinder member having forward and rearward ends and having a central passageway;

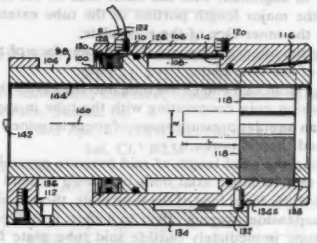
die means movably mounted at the front portion of said inner member to close and open;

an outer piston member disposed about said inner member and movable forwardly and rearwardly with respect to said inner member, said outer member having a forward

portion coupled to said die means to force said die means toward a closed configuration when said outer member moves in a forward direction;

said inner member having an outwardly-extending flange sealed to the inside of said outer member, and said outer member having an inwardly-extending forward portion sealed to the outside of said inner member forward of said flange, to form a forward hydraulic chamber;

a ring disposed around said inner member rearwardly of said flange, said ring sealed to the outer surface of said



inner member and the inner surface of said outer member, to form a rearward hydraulic chamber;

means for coupling ring to said outer member to allow said ring to apply rearward force to said outer member; and

means for coupling hydraulic fluid to said forward hydraulic chamber to pressurize said hydraulic chamber and move said outer member forwardly, and for coupling hydraulic fluid to said rearward hydraulic chamber to pressure said rearward hydraulic chamber and move said ring and outer member rearwardly.

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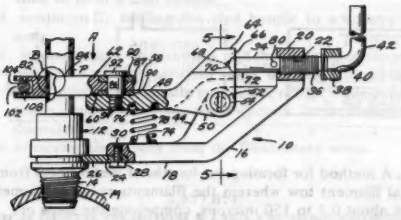
**3,977,066**

## PIPEFITTING SECURING TOOL

**Robert E. Sands, Shelbyville; Carl E. Floren, Decatur, and William L. Hauffe, Warrensburg, all of Ill., assignors to Mueller Co., Decatur, Ill.**

**Filed Sept. 19, 1975, Ser. No. 615,097**
**Int. Cl.² B23P** *19/04*
**U.S. Cl. 29—237** **15 Claims**



**1.** A tool for inserting a plastic or other pipe substantially axially into a stab-type coupling joint fitting or the like comprising:

an elongated base member with a first end portion and a second end portion offset with respect to the first end portion, said second end portion having a threaded bore therethrough;

a jaw member detachably secured to said first end portion of said elongated base member for engaging the coupling joint fitting;

a lever member pivotally mounted to said base member on an axis offset from a plane of said jaw member and transverse to an axis of the threaded bore in said second end portion of said base member, said lever member having an end portion extending generally in the same direction as the first end portion of said base member and having a further end portion defining a surface spaced from and facing the second end portion of said base member;

split clamp means detachably connected to the end portion of said lever member for clamping about the plastic or other pipe without damaging the same;

means for maintaining the jaw and said clamp means a predetermined distance apart prior to actuation of the tool; and,

a feed shaft having a threaded portion received in the threaded bore of said base member and an end portion engaging the surface of the further end portion of said lever member for pivoting said lever member and moving said clamp means toward said jaw when said shaft is rotated.

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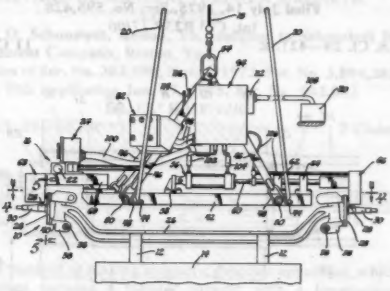
**3,977,067**

## METHOD AND APPARATUS FOR INDICATING AND ADJUSTING TOE-SETTING

**Richard A. LaValley, North Branch, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Aug. 15, 1975, Ser. No. 605,151**
**Int. Cl.² B23Q** *17/00*
**U.S. Cl. 29—407** **7 Claims**



**4.** A method for adjusting the toe-setting of a front axle assembly including a front axle having a steering knuckle including a brake backing plate mounting surface and an associated spindle pivotally mounted on each end thereof, and a tie rod operatively connected between said brake backing plate mounting surfaces and adapted to change the relative angularity of said brake backing plate mounting surfaces upon selective manual rotation of the tie rod, said method comprising the steps:

a. providing relatively movable oppositely disposed clamping means, each having position sensors mounted thereon;

b. providing visual indicators responsive to signals from said sensors for indicating the relative positions of, and, hence, the toe-in relationship between said brake backing plate mounting surfaces;

c. mounting said relatively movable oppositely disposed clamping means on respective spindles;

d. slidably moving said clamping means along said spindles until said sensors operatively contact said brake backing plate mounting surfaces;

e. manually rotating said tie rod to selectively adjust the relative toe-in positions of said brake backing plate mounting surfaces with respect to said sensors, until the desired toe-setting relationship is indicated by said visual indicators; and

f. securing said tie rods in adjusted position to maintain the desired toe-setting relationship.

**5.** For use with a front axle assembly including a front axle having a steering knuckle including a brake backing plate mounting surface and an associated spindle pivotally mounted

on each end thereof, and a tie rod operatively connected between the brake backing plate mounting surfaces and adapted to change the relative angularity of the brake backing plate mounting surfaces upon selective rotation of the tie rod, thereby adjusting toe-in relationship of the brake backing plate mounting surfaces, a toe-setting indicating machine comprising a base plate, relatively movable first and second reference plates slidably mounted on opposite ends of said base plate, a pair of sensors mounted on each of said first and second reference plates, means for mounting each of said first and second reference plates on said spindles, control means for moving said reference plates along said spindles causing said sensors to operatively contact respective brake backing plate mounting surfaces, a condition panel mounted adjacent said control means including a set of visual indicators mounted thereon for indicating in response to signals from said sensors the spatial position of said brake backing plate mounting surfaces with respect to the spatial position of said sensors, said relative positions and said signals changing in response to rotation of said tie rods.

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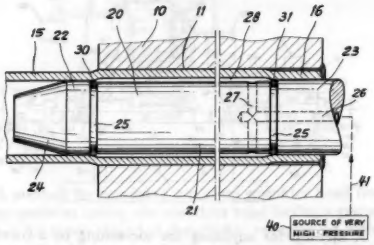
**3,977,068**

## DEVICE AND METHOD FOR EXPANSION-SWAGING TUBES INTO THE BORES OF A TUBE PLATE

**Herbert Krips, Bochum-Langendreer, Germany, assignor to Balcke-Durr Aktiengesellschaft, Ratingen, Germany**

**Filed July 14, 1975, Ser. No. 595,428**
**Int. Cl.² B23P 17/00**
**U.S. Cl. 29—421. R** **11 Claims**




**1.** A device for expansion-swaging a tube against the inner wall of a slightly larger anchoring bore of a tube plate, by forcibly expanding the tube into radial engagement with said wall, under a very high pressure created inside the tube, within a predetermined expansion length portion thereof, the device comprsing in combination:

a unitary expansion core capable of being inserted into the cavity of said tube, said core having several length portions of unequal outer diameter, inlcuding, in succession: an inner core guide portion engaging the tube with minimal insertion clearance; a core midportion of a length corresponding to said expansion length portion and having a diameter which is a small amount smaller than that of the tube cavity, so as to define a radially very narrow pressure space therewith of a radial width just adequate for the pressure fluid to penetrate all areas of the pressure space; and an outer core guide portion likewise engaging the tube with minimal insertion clearance;

a pair of annular grooves between the inner and outer core guide portions and the core midportion, said grooves having radial flanks forming abutment shoulders at the near extremities of the inner and outer core guide portions, said shoulders facing against one another;

a pair of resilient, highly pressure resistant pressure rings seated snugly in said annular grooves of the expansion core, and having an outer diameter which, prior to insertion of the core into the tube cavity, is larger than the latter, said pressure rings thus delimiting and sealing the pressure space in the axial direction;

a high pressure source capable of supplying pressure fluid at a pressure of at least 3000 kp/cm²; and

channel means for bringing said pressurized fluid into the pressure space.

**8.** A method of expansion-swaging a tube against the inner wall of a slightly larger anchoring bore of a tube plate, for instance the tube plate of a heat exchanger, by forcibly expanding the tube into radial engagement with said wall, the method comprising the steps of:

positioning the tube in the anchoring bore of the tube plate in such a way that one end of the tube is located substantially in alignment with the outer face of the tube plate and the major length portion of the tube extends away from the inner face of the tube plate;

welding the aligned tube end to the outer face of the outer face of the tube plate;

inserting from said end of the tube into the cavity thereof an expansion core cooperating with the tube in such a way that an annular pressure space of predetermined length is formed therebetween;

delimiting the axial length of said pressure space in such a way that its inner axial limit is located a small distance outside the inner face of the tube plate, thereby extending the expansion-swaging effect to a short length portion of the tube immediately outside said tube plate face, and that the outer axial limit of the pressure space is located within the tube plate, at such a distance from the welded tube end that the expansion-swaging deformation taking place in the area of the pressure space is without stress effect on the weld connection;

sealing said axial limits of the pressure space with resilient, highly pressure resistant pressure rings; and

introducing into the pressure space a pressure fluid under a pressure of at least 3000 kp/cm².

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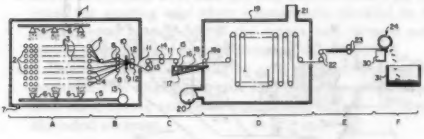
**3,977,069**

## PROCESS AND APPARATUS FOR PRODUCTION OF PRECISION CUT LENGTHS OF METAL WIRES AND FIBERS

**George Hector Domaingue, Jr., Milford, Conn., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Dec. 18, 1974, Ser. No. 533,988**
**Int. Cl.² B23P 17/04**
**U.S. Cl. 29—424** **30 Claims**




**1.** A method for forming cut lengths of metal fibers from a metal filament tow wherein the filaments range in diameter from about 0.5 to 150 microns, comprising the steps of:

a. moistening each of a plurality of spools of metal filament tow with water;

b. unwinding a tow band from each of the spools, said tow band being loose and permeable;

c. laying up said tow bands in the form of a ribbon;

d. stiffening said ribbon into a flat, rigid band; and

e. cutting said stiffened ribbon to desired lengths with a shearing cutting action that prevents cold welding or deformation of the ends when cut.

**15.** An apparatus for producing precision cut lengths of metal fibers having a diameter ranging from about 0.5 to about 150 microns which comprises:

a. a multispool creel containing spools of metal fibers in tow form;

b. means to wet the spools with water;

c. guiding means to guide tow bands unwound from the spools to a targeting section;
d. means in the targeting section to lay up said tow bands into a continuous ribbon;
e. guiding means to pass the ribbon into a means for stiffening the ribbon into a flat, rigid band;
f. guiding means for passing said stiffened ribbon to a precision shearing action cutting means whereby the ribbon is cut to precision lengths; and
g. means to prevent cold welding or deformation of the ends of the fibers when sheared, thereby enabling total individual fiber separation.

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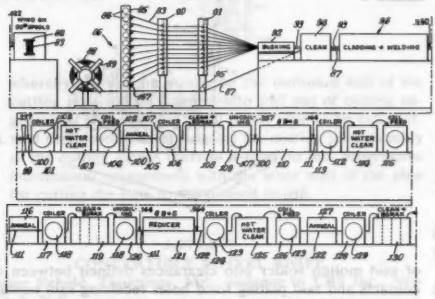
**3,977,070**

## METHOD OF CONTINUOUSLY PRODUCING FINE METAL FILAMENTS

**August J. Schildbach, Concord, Mass., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Apr. 1, 1969, Ser. No. 811,780**
**Int. Cl.² B23P *17/00***
**U.S. Cl. 29—423** **3 Claims**



1. In a method of forming a tow of metal filaments comprising the steps of:
1. feeding continuously a plurality of metal wires and continuously providing about each of the plurality of metal wires a sheath formed of a metal differing from that of the wires;
2. feeding continuously a plurality of said sheathed wires in a preselected array to a cladding zone to form a bundle;
3. continuously strip cladding the bundle in said cladding zone to form a clad bundle;
4. continuously feeding the clad bundle to a constricting zone;
5. sequentially cold drawing and heat treating the clad bundle in said constricting zone to form the sheathed metal into a substantially monolithic matrix while concurrently constricting the wires therein to a filamentary diameter; and
6. removing the matrix from the filamentary wires.

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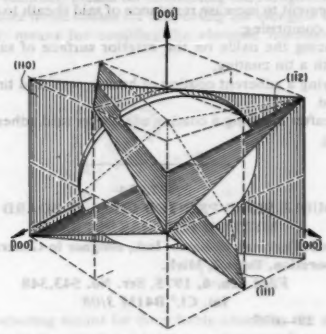
**3,977,071**

## HIGH DEPTH-TO-WIDTH RATIO ETCHING PROCESS FOR MONOCRYSTALLINE GERMANIUM SEMICONDUCTOR MATERIALS

**Hall E. Jarman, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Sept. 29, 1969, Ser. No. 862,646**
**Int. Cl.² B01J *17/00*; H01L *31/18***
**U.S. Cl. 29—580** **18 Claims**

1. The process for making a high depth-to-width ratio etched groove in the surface of a germanium-comprising semiconductor body which comprises the steps of:
forming an etching mask on a (110) surface of a slice of monocrystalline germanium-comprising semiconductor material having an opening therein, the length of which is parallel to a (111) plane of the monocrystalline material which is normal to said surface; and




subjecting the exposed area of the semiconductor surface to a preferential etching fluid which attacks a (110) plane of germanium crystal fastest and a (111) plane slowest.

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**3,977,072**

## METHOD OF MANUFACTURING A MAGNETIC LOCATOR

**Erick O. Schonstedt, Reston, Va., assignor to Schonstedt Instrument Company, Reston, Va.**

**Division of Ser. No. 303,598, Nov. 3, 1972, Pat. No. 3,894,283.**
**This application Jan. 17, 1975, Ser. No. 542,082**
**Int. Cl.² H01F *41/00***
**U.S. Cl. 29—602 R** **7 Claims**

1. A method of making magnetic detector apparatus, which comprises forming a tubular support with a longitudinal groove at each end, each groove being open at one side thereof and having an approximately C-shaped cross-section, and press-fitting a magnetic sensor into each groove laterally from the open side thereof.

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**3,977,073**

## METHOD OF MAKING ELECTRIC IMMERSION HEATERS

**Robert D. Shirey, Pittsburgh, Pa., assignor to Emerson Electric Co., St. Louis, Mo.**

**Filed Aug. 11, 1975, Ser. No. 603,346**
**Int. Cl.² H05B *3/10*, *3/82***
**U.S. Cl. 29—611** **3 Claims**

1. The method of making an electric immersion heater having a sheath formed of aluminum tubing, said sheath having one end connected to a mounting member, comprising the

usual steps of assembling a resistor coil, refractory material, end bushing means and terminal pins within said sheath, the improvement to increase resistance of said sheath to corrosive action, comprising:

replacing the oxide on the exterior surface of said sheath with a tin coating,

applying a adherent coating of bronze over said tin coating, and

thereafter applying a coating of tin over said adherent coating.

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**3,977,074**

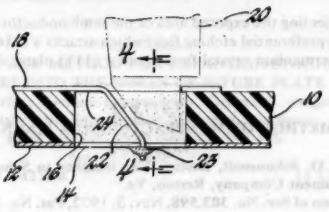
## DOUBLE SIDED PRINTED CIRCUIT BOARD AND METHOD FOR MAKING SAME

**Thomas J. Furnival, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 6, 1975, Ser. No. 543,348**

**Int. Cl.² B41M *3/08***

**U.S. Cl. 29—625** **3 Claims**




1. The method of fabricating a double sided printed circuit board with electrical interconnections through the board comprising

forming conductive paths on a first side of an insulated substrate, the paths extending to desired interconnection sites,

forming an aperture through the substrate at the site of each desired interconnection,

providing conductive paths on the second side of the substrate with portions of said paths overlying the apertures,

deflecting each portion of said path overlying an aperture through the aperture to form an integral tab connection having a free end extending through the aperture to a position adjacent a path on the first side of the substrate, and

connecting the tab connector with the path on the first side of the substrate.

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**3,977,075**

## METHOD OF FABRICATING MULTI-LAYER PRINTED CIRCUIT BOARD

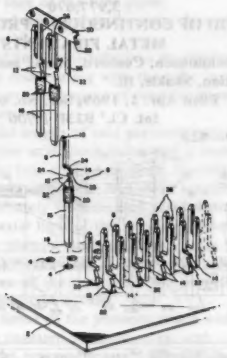
**James Edward Lynch; Kenneth Ronald Parmer, both of Harrisburg, and Robert Franklin Cobaugh, Elizabethtown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Division of Ser. No. 340,797, March 13, 1973, Pat. No. 3,905,665, and a continuation-in-part of Ser. No. 321,076, Jan. 4, 1973, abandoned, and a continuation-in-part of Ser. No. 193,366, Oct. 28, 1971, abandoned, and a continuation of Ser. No. 224,504, Feb. 8, 1972, abandoned, said Ser. No. 340,797, and said Ser. No. 224,504, each is a continuation-in-part of Ser. No. 166,540, July 27, 1971, abandoned, said Ser. No. 224,504, is a continuation-in-part of said Ser. No. 193,366. This application June 17, 1975, Ser. No. 587,767**

**Int. Cl.² H05K *1/04, 1/14, 3/36***

**U.S. Cl. 29—628** **1 Claim**

1. A method of fabricating a multi-layer printed circuit board, comprising the steps of: maintaining a plurality of separate printed circuit boards in spaced stacked relationship, providing a plurality of selected aligned plating lined holes in said plurality of boards, providing a plurality of electrically conducting elongated contacts with solidified solder bands adhered thereto, receiving said contacts together with said solder bands internally of corresponding plating lined holes provided in said boards to provide an assembly, maintaining the alignment of said contacts while preheating said contacts to an elevated temperature to reduce said solder bands to a molten state, maintaining said contacts in desired alignment while immersing said assembly in a fluidized dielectric at elevated temperature, filling the spacings between adjacent spaced boards with said fluidized dielectric, heating said solder bands to a molten state by said dielectric, wicking masses



of said molten solder into clearances defined between said contacts and said plating lined holes receiving said contacts, substantially filling said clearances with molten solder by said wicking action, agglomerating additional masses of solder at each open end of said plating lined holes to form solder fillets encircling said contacts, removing said assembly from immersion in said dielectric, cooling said assembly to form rigid solder joints and to solidify masses of dielectric in the spacings between said adjacent boards to encapsulate said boards into a single multi-layer board and to provide a layer of dielectric insulation between adjacent boards, and applying a solvent to said assembly to remove undesired dielectric.

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**3,977,076**

## INTERNAL PIPE CUTTING TOOL

**Manuel Vieira; Michael M. Vieira; Manuel Vieira, Jr., and Robert M. Vieira, all of Union, N.J., assignors to One Michigan Avenue Corporation, Union, N.J.**

**Filed Oct. 23, 1975, Ser. No. 625,021**

**Int. Cl.³ B23D *21/14;* B26D *3/16***

**U.S. Cl. 30—103** **10 Claims**

1. An internal pipe cutting tool for cutting pipe from the inner wall out comprising:

a. an elongated support member having, an adjustable support collar to adjust the cutting length of said internal pipe cutting tool,

b. cam means connected to the end of the support member remote from the adjustable collar, and a cam surface means formed on the outer face of said cam means,

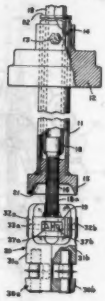
c. a drive member rotatably mounted on said support member and rotatable from a point exterior of the support member at one end and having the other end disposed adjacent the cam means,

d. support and guide means connected to the end of the drive member adjacent the cam means,

e. a plurality of operatively associated cutting jaws each pivotally connected at a medial point thereon to the support and guide means, cutting means on the outboard

end of each said cutting jaws, and said cutting jaws disposed in normally closed position,

f. said support member rotatable in one direction to bring the cam means into engagement with the cutting jaws for opening the same and in the other direction to permit the cutting jaws to return to their normally closed position



whereby the cutting means on the outboard end of the cutting jaws will be brought into and out of cutting engagement with the inner wall of the pipe to be cut, and

g. said drive member for rotating the cutting jaw assembly as the cutting means thereon is brought into progressive incremental engagement with the inner wall of the pipe for cutting the pipe to the desired length.

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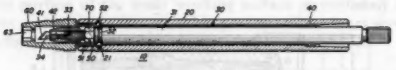
**3,977,077**

## CONVERTIBLE SWIVEL KNIFE

**Jerome Rebold, Timonium, Md., assignor to CBS Inc., New York, N.Y.**

**Filed Sept. 2, 1975, Ser. No. 609,492**
**Int. Cl.² B26B *1/04***
**U.S. Cl. 30—151** **9 Claims**



1. A swivel knife that is convertible for use as a conventional knife wherein the blade is rigidly mounted, comprising:

a tubular housing having front and rear ends;

an elongated generally cylindrical stem mounted in said housing and normally rotatable with respect thereto, said stem having a blade-holding end at the front of said housing and a free end at the rear of said housing, said stem being proportioned at said free end to be radially spaced from said housing; and

a cap member comprising a hollow generally cylindrical shell proportioned to be forcibly inserted in the space between said housing and said free end so as to prevent relative rotation of said stem in said housing.

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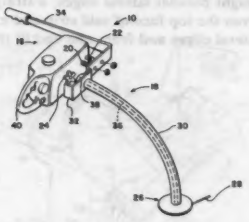
**3,977,078**

## GRASS CUTTING CHAIN SAW DRIVE SYSTEM

**Charles B. Pittinger, Jr., 320 Cockeys Mill Road, Reisterstown, Md. 21136**

**Filed June 17, 1975, Ser. No. 587,649**
**Int. Cl.² A01D *35/26*; B26B *25/00***
**U.S. Cl. 30—276** **12 Claims**

1. The combination of a grass cutting adapter and a chain saw drive comprising: the chain saw drive including a motor with an output, a frame holding the motor and having at least one attachment point proximate the output; the grass cutting adapter comprising a detachable unitary assembly including: a cutter head, means for rotating the cutter head, including an elongate member, means for connecting the elongate member to the cutter head, means for supporting the elongate member rotatably, means for coupling the elongate member to the



output including means for detachably attaching the supporting means to the attachment point, and means for manually grasping said combination for grass cutting, comprising a handle extending past the frame in a generally horizontal direction.

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**3,977,079**

## KNIFE HAVING EASILY REMOVABLE BLADE

**Jerome I. Rebold, Timonium, Md., assignor to CBS Inc., New York, N.Y.**

**Filed Nov. 12, 1975, Ser. No. 631,209**
**Int. Cl.² B26B *1/00***
**U.S. Cl. 30—336** **4 Claims**

1. A knife having a removable blade, comprising:

an elongated tubular housing having front and rear ends;

an elongated stem proportioned to fit slidably in said housing;

said stem widening circumferentially in tapered fashion at the front end of said housing to define a blade-holding chuck having a blade-receiving slot, said chuck being circumferentially proportioned to be compressed within said housing when said stem is slid rearwardly so as to contract the width of said slot to a blade-grasping width; and

a toggle lever pivotally mounted on said stem at the rear end of said housing, said lever having a beveled edge opposing the rear edge of said housing and adapted, when said toggle lever is pivotally urged to a position essentially colinear with said housing, to contact said rear edge and forcibly slide said stem rearwardly in said housing so as to contract said blade-receiving slot, and also adapted, when said toggle lever is at an angle with respect to said housing, to allow said stem to slide frontwardly in said housing so as to allow expansion of said slot to a blade-receiving width.

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**3,977,080**

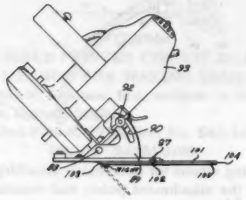
## CUTTING GUIDE FOR POWER HANDSAW

**Joseph Paul Allaire, 228 NE. 22nd Ave. - Apt. 4, Pompano Beach, Fla. 33062**

**Filed July 30, 1975, Ser. No. 600,294**
**Int. Cl.² B27B *27/02***
**U.S. Cl. 30—376** **2 Claims**

1. A cutting guide for a powered handsaw of the type including a motor housing, a motor in said housing, a saw blade driven by said motor, a base plate hinged to said motor housing about an axis parallel to the plane of said saw blade and close to the latter, and means to removably secure said base

plate in at least two pivotal positions relative to said housing and blade to perform 90° and 45° cuts, respectively, said base plate having a straight groove at its underface running from end to end and parallel to the plane of said saw blade, said cutting guide comprising a strip having a flat bottom face and opposite straight parallel lateral edges, a straight guide ridge projecting from the top face of said strip and extending parallel to said lateral edges and from one end to the other of said



strip, said ridge slidably fitting within said groove of said base plate, when said base plate rests on said strip, one of the two lateral edges being closer to the guide ridge, being at a distance such that it extends very close to the saw blade when the latter is inclined to make a 45° cut, the other lateral edge being farther away from said guide ridge at a distance such that it extends very close to the saw blade when the latter is in upright position to perform a 90° cut.

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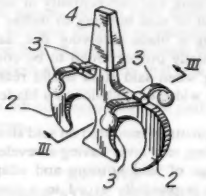
**3,977,081**

**RIGID IMPLANTATIONS FOR SURGICAL PURPOSES**

**Celestino Zambelli, Milan, and Fiorino Pagani, Lucca, both of Italy, assignors to Bioimplant S.a.s. di Fiorino Pagani & C., Lucca, Italy**

**Continuation-in-part of Ser. No. 453,006, March 19, 1974, abandoned. This application Mar. 4, 1975, Ser. No. 555,300**
**Claims priority, application Italy, Mar. 22, 1973, 21974/73**
**Int. Cl.² A61C 9/00**
**U.S. Cl. 32—10 A** **5 Claims**



1. A rigid implantation for dental uses, comprising a metal core completely covered with a firmly adhering layer of tetrafluoroethylene or polymers thereof, including a tooth supporting stump, an elongated endosseous portion supporting said stump and having means for implantation in the jawbone of a patient and a juxtaosseous portion located between said stump and said endosseous portion with means for externally bearing on said jawbone of the patient, the implantation having rounded edges.

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**3,977,082**

**PALATAL EXPANDER**

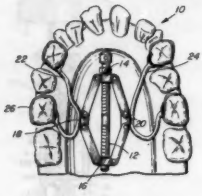
**Raymond E. Siatkowski, Main St., Essex, Conn. 06426**

**Filed Sept. 23, 1975, Ser. No. 615,922**
**Int. Cl.² A61C 7/00**
**U.S. Cl. 32—14 E** **5 Claims**

1. A device for expanding a patient's palate laterally and comprising in combination:

a. a longitudinally extending screw having oppositely threaded segments, and having an interior end adapted to be located behind the patient's upper front teeth said interior end defining a head adapted to receive a torque applying tool,

b. a front nut and a rear nut threadably received on front and rear segments of said screw, said nuts being movable in opposite longitudinal directions in response to rotation of said screw.



c. left and right hand linkages, each of which linkages are pivotally connected to said front and rear nuts respectively, and each of which linkages includes an apex which moves laterally in response to the longitudinal movement of said nuts, and

d. orthodontic wires carried by said apexes and including free end portions adapted for attachment to the patient's teeth.

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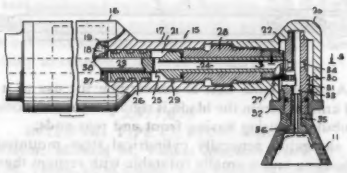
**3,977,083**

**DENTAL INSTRUMENT**

**Norman Leslie, 17015 Escalon Drive, and Ben A. Otsap, 5437 Newcastle Ave., both of Encino, Calif. 91316**

**Filed Feb. 5, 1974, Ser. No. 440,154**
**Int. Cl.² A61C 3/06**
**U.S. Cl. 32—58** **6 Claims**



1. In a dental instrument for cleaning teeth, including a hand piece and a power means, the improvement comprising:

a polishing cup having an abrasive material embeded therein, said cup rotatively secured to said handpiece;

driving means disposed within said handpiece and adapted to transfer energy from the power means to said polishing cup, whereby said cup is rotated when the power means is actuated, said driving means having a passageway extending therethrough in communication with the internal surface of said cup; and

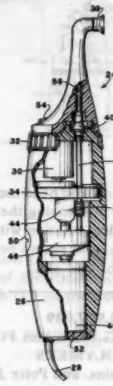
means for supplying a flow of fluid through said driving means into said cup said means comprising a pump secured to said driving means and adapted to rotate in conjunction therewith whereby fluid is drawn by said pump from a reservoir and deposited into the passageway in said driving means in communication with the internal surface of said cup, whereby the fluid lubricates said driving means and provides a cooling film to the internal surface of said cup.

3,977,084

## DENTAL HYGIENIC DEVICE

Robert I. Sloan, West Vancouver, Canada, assignor to TSSET Scientific and Pharmaceutical Limited, Canada

Filed Aug. 26, 1974, Ser. No. 500,376
Int. Cl.² A61C 3/06
U.S. Cl. 32—59 11 Claims



1. A dental hygienic device including a rotable bell-shaped prophylactic cup and means for rotating said cup about the axis thereof, said cup having a generally concave inner working surface designed to flair outwardly and adapt to contacted tooth surfaces, said inner working surface having a circumferentially outer lip for insertion into the gingival crevice, the outer surface of said cup including a shoulder for limiting the insertion of said lip into the gingival crevice, said inner working surface having abrasive means thereon, said abrasive means being arranged to have a varying abrasive effect dependent upon the radial distance from the outer circumference of said lip, the abrasive means having a lesser abrasive effect on that portion of the inner working surface immediately adjacent said outer lip than on other portions of the inner working surface.

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3,977,085

## PENDULUM TOY

Robert L. Sandifer, 739 N. Dougherty, Wichita, Kans. 67212

Filed Oct. 20, 1975, Ser. No. 623,728
Int. Cl.² B43L 11/00
U.S. Cl. 33—27 L 11 Claims

1. A pendulum toy using a marking instrument for making a variety of designs on a work sheet positioned on a planar horizontal surface of a table, the toy comprising:

a first and second pendulum rod pivot means positioned on the horizontal surface of the table:

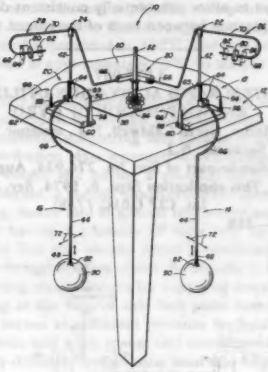
a first and second pendulum rod pivotally supported on said first and second pivot means;

said first and second pendulum rods having a vertically positioned first end portion, a vertically positioned second end portion, and a center portion, the first end portion positioned above said horizontal surface of the table and seated in said pivot means, the second end portion positioned below the horizontal surface of the table, said center portion connecting said first and second end portions and therefore extending plane; an edge of said planar surface with enough clearance to allow pivoting of said pendulum rods in a vertical plane:

a first and second pendulum weight attached to the second end portions of said first and second pendulum rods substantially directly below said pendulum rod pivot means;

a first connecting rod pivotally attached to the first end portion of said first pendulum rod;

a second connecting rod pivotally attached to the first end portion of said second pendulum rod;



a pen holder attached to said first and second connecting rods, said pen holder holding a pen for drawing designs on the work sheet.

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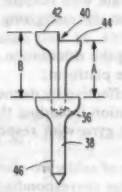
3,977,086

## RANGE ESTIMATING DEVICE FOR GOLFERS

Albert J. Williams, Jr., 901 Llanfair Road, Ambler, Pa. 19002

Filed May 8, 1975, Ser. No. 575,733
Int. Cl.² G01C 3/00
U.S. Cl. 33—277 1 Claim



1. Apparatus for estimating the number of a user's paces required to traverse the distance between the user and a standard golf course flagstick, comprising:

a first annular element;

a first, elongate stem depending downwardly from said first annular element and coaxial therewith;

a second annular element having a diameter equal to said first annular element;

a second, elongate stem depending downwardly from said second annular element and being substantially longer than said first elongate stem;

said first annular element having an upper surface which is diametrically divided to form an elevational profile defining first and second straight, horizontal ridges;

said second annular element having an upper surface forming an elevational profile defining a third straight, horizontal ridge and having an axial aperture centrally located therein;

said first, elongate stem having a lower end firmly seated in said axial aperture;

said first straight, horizontal ridge being disposed 47/64 inch above said third straight, horizontal ridge;

said second straight, horizontal ridge being disposed 54/64 inch above said third straight, horizontal ridge;

whereby a loss in visual definition of the ridges due to the proximity of the apparatus to the user's eye is compensated for to allow substantially consistent determination of the distance between ones of the ridges.

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3,977,087

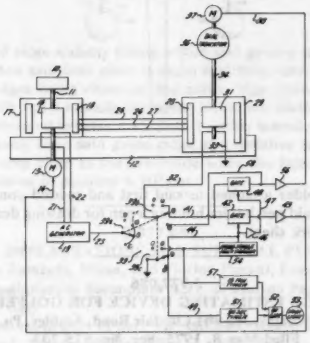
## GYRO SYSTEM RAPID ACTIVATION UTILIZING LAST KNOWN POSITION OF GYRO

Jan Kuno Moller, North Caldwell, N.J., assignor to AGA Corporation, Secaucus, N.J.

Continuation-in-part of Ser. No. 276,924, Aug. 1, 1972, abandoned. This application Sept. 6, 1974, Ser. No. 503,649

Int. Cl.² G01C *17/00*

U.S. Cl. 33—318 5 Claims



1. In an orientation indicating system:

a movable platform;

a gyro mounted (to move with and having a portion for rotation) to rotate with respect to said platform;

means for selectively energizing and de-energizing said gyro;

means for sensing the orientation of said gyro with respect to said movable platform;

means rendered effective by deenergization of said gyro for storing information including the last orientation of said portion of said gyro with respect to said movable platforms; and

means for driving of said gyro upon re-energization thereof to an orientation corresponding to said stored information indicating the last orientation of said gyro.

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3,977,088

## VERTICAL POSITIONING DEVICE

Herman H. Bondi, 1224 SE. Henry, Portland, Oreg. 97202

Division of Ser. No. 293,390, Sept. 29, 1972, Pat. No. 3,879,852. This application Mar. 24, 1975, Ser. No. 561,196

Int. Cl.² B25C *7/00*; B25B *29/00*

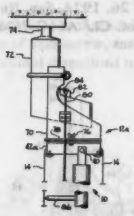
U.S. Cl. 33—334 7 Claims

1. A device for attaching a fastener to an overhead surface in predetermined vertical relation to a known point at a lower elevation, said device comprising:

a. an elongate support member;

b. a hand-held type stud gun having a hand grip and a finger-actuated trigger for shooting a fastener into said overhead surface;

c. head means mounted atop said support member, said head means comprising hanger means for supporting a plumb line at a position laterally outward from said support member, and frame means for detachably mounting said hand-held type stud gun in an upwardly-facing direction so as to permit the muzzle of said gun to be elevated by said support member into proximity with said overhead surface; and



d. a plumb line mounted on said head means to depend from said hanger means for positioning the muzzle of said gun in predetermined vertical relation with said known point at said lower elevation, said plumb being vertically alignable with the muzzle of said gun.

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3,977,089

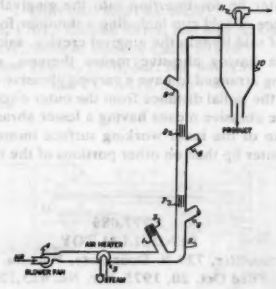
## MICROWAVE DRYING PROCESS FOR SYNTHETIC POLYMERS

Eric O. Forster, Scotch Plains, and Peter J. Creighton, Mendham, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 9,247, Sept. 9, 1969, Pat. No. 3,771,234. This application Nov. 18, 1971, Ser. No. 200,257

Int. Cl.² F26B *3/34*

U.S. Cl. 34—1 4 Claims



1. In a process for preparing an essentially nonpolar synthetic polymer utilizing a polar vehicle from which said polymer is separated, the improvement which comprises:

a. transferring said polymer to a transfer line resonating cavity having introduced therein, at at least one point, microwave energy at a frequency of about 600 to 50,000 MHZ; and

b. conveying said polymer through said transfer line for a period of time sufficient to reduce the polar vehicle content of said polymer to less than 5000 ppm.

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3,977,090

## FIXED-BED VAPOR/SOLIDS CONTACTING DEVICE

Donald Maurice Sowards, Claymont, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

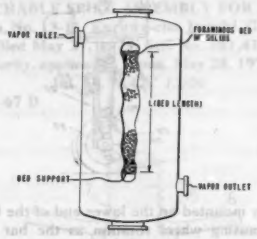
Filed Jan. 27, 1975, Ser. No. 544,311

Int. Cl.² F26B *3/00*

U.S. Cl. 34—9 6 Claims

6. A method for contacting non-condensing vapors with the surface of solids comprising passing the vapors at a velocity

(V) of 0.1 to 35 m/sec through a process vessel having vapor inlet and outlet means at opposite ends of a fixed foraminous bed of solids, the bed being further characterized in that the




void volume fraction (E) of the bed is from 0.3 to 0.98, the surface area (S) of the foraminous solids is from 0.15 to 5 $m^2$/liter, the length (L) of the bed is from 0.03 to 3.5 m and the relationship

$$\frac{E^3S^2L\Delta P}{V^2}$$

is at least 1, but not more than 100.

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**3,977,091**

## TEMPERING AND STERILIZING DEVICE

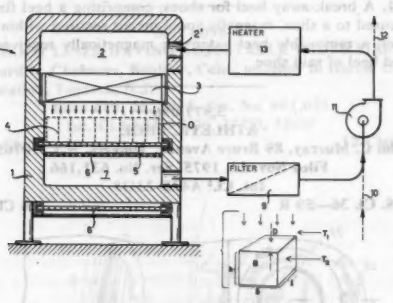
**Hans-Peter Hortig, Frankfurt am Main, and Hans Pfeiffer, Bad Soden, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Continuation-in-part of Ser. No. 53,234, July 8, 1970, abandoned. This application May 24, 1972, Ser. No. 256,366**

**Claims priority, application Germany, July 19, 1969, 1936865**

**Int. Cl.² F26B** *25/00*

**U.S. Cl. 34—105** **20 Claims**




**1. A device for tempering objects which are to be kept free from contamination by foreign particles which comprises, a housing, means for supporting said objects in said housing, a first gas distribution plate mounted in said housing above said supporting means and having a plurality of relatively small apertures therein, a second gas distribution plate mounted in said housing, below and in spaced relation to said supporting means and having a plurality of relatively small apertures therein, said first and second plates cooperating to define a work space in said housing about the objects to be treated on said supporting means, means for supplying conditioned air to said housing at the side of said first plate remote from said supporting means at sufficient pressure for said conditioned air to flow into said work space, said conditioned air having a substantially different temperature than said objects, and said first and second plates providing a predetermined pressure drop between their opposite faces to produce a laminar flow of conditioned air downwardly from said first plate over the objects on said supporting means through said supporting means and second plate for discharge from said housing; said supporting means having a plurality of openings therein to permit said laminar flow therethrough; said objects having a temperature of approximately 350°C. and said conditioned air being supplied at approximately 50°C. to temper and cool said objects.**

**11. A device for sterilizing objects which are to be kept free from contamination by foreign particles which comprises, a housing, means for supporting said objects in said housing, a first gas distribution plate mounted in said housing above said supporting means and having a plurality of relatively small apertures therein, a second gas distribution plate mounted in said housing, below and in spaced relation to said supporting means and having a plurality of relatively small apertures therein, said first and second plates cooperating to define a work space in said housing about the objects to be treated on said supporting means, means for supplying conditioned air to said housing at the side of said first plate remote from said supporting means at sufficient pressure for said conditioned air to flow into said work space, said conditioned air having a substantially different temperature than said objects, and said first and second plates providing a predetermined pressure drop between their opposite faces to produce a laminar flow of conditioned air downwardly from said first plate over the objects on said supporting means through said supporting means and second plate for discharge from said housing; said supporting means having a plurality of openings therein to permit said laminar flow therethrough; said objects being supplied to said housing at a predetermined temperature and said means for supplying conditioned air supplying said air at a temperature approximately 300°C. greater than said predetermined temperature to sterilize said objects.**

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**3,977,092**

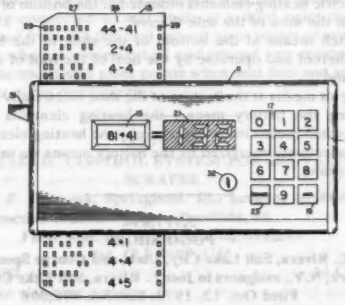
## TEACHING MACHINE CARD

**Ernest R. Duncan, Harmony Hill, Mount Harmony Road, Bernardsville, N.J. 07924**

**Division of Ser. No. 382,273, July 24, 1973, Pat. No. 3,925,909. This application Dec. 16, 1975, Ser. No. 641,280**

**Int. Cl.² G09B** *7/00*

**U.S. Cl. 35—48 A** **3 Claims**




**1. A record member for use in a teaching machine comprising: first and second opposing planar surfaces; a column of visibly readable statements of problems on said first planar surfaces; a column of perforated machine readable answers on said first planar surface corresponding to the problems on the column of visibly readable statements of problems; indexing means on said record member to enable incremental advancement of said record member; the machine readable answers in**

said column of answers being displaced from the corresponding visibly readable statement of a problem in said column of problems to impede visual decoding of the machine readable answer;

a column of visibly readable statements of problems on said second planar surface;

a column of machine readable answers on said second planar surface corresponding to the problems in the column of visibly readable statements on said second planar surface;

the machine readable answers on said second planar surface in said column of answers on said second planar surface being displaced from the corresponding visually readable statement of a problem in said column of problems on said second planar surface.

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**3,977,093**

**COLD WEATHER SHOE**

**Gilbert L. Santroch, Hayward, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Jan. 19, 1976, Ser. No. 650,136**
**Int. Cl.² A43B *7/02***
**U.S. Cl. 36—2.6** **4 Claims**

1. A cold weather shoe having an enclosure having a bottom with an inside surface and an outside surface, a sole on the outside surface of the bottom and a heel area on the outside surface of the bottom, said cold weather shoe comprising

a hollow heel movably mounted in the heel area of the bottom of the shoe;

battery means mounted in the heel;

electric heating elements mounted at the bottom of the shoe in the area of the sole thereof;

switch means at the bottom of the shoe in the heel area thereof and operable by the heel of the foot of a wearer; and

circuit means at the bottom of the shoe electrically connecting the battery means, the heating elements and the switch means in circuit whereby the heating elements are selectively energized by the battery means via said switch means.

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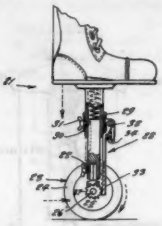
**3,977,094**

**POGO SHOES**

**Jose L. Rivera, Salt Lake City, Utah, and George Spector, New York, N.Y., assignors to Jose L. Rivera, Salt Lake City, Utah**

**Filed Oct. 12, 1973, Ser. No. 406,008**
**Int. Cl.² A43B *3/10***
**U.S. Cl. 36—7.8** **2 Claims**

1. A pogo shoe comprising a pogo stick assembly with a shoe mounted thereon, said assembly comprising a plate attached to the sole of the shoe including a sleeve with a spring mounted therein, including a bar slidably mounted in said sleeve bearing against said spring, said bar projecting from one end of the sleeve having a ground bearing member mounted at the lower end of the bar, said sleeve having a longitudinal slot coacting with a transverse pin projecting from said bar whereby the bar is guided for non-rotational longitudinal reciprocation in said sleeve, and said member is a wheel and



axle rotatably mounted on the lower end of the bar including means for causing wheel rotation as the bar reciprocates longitudinally.

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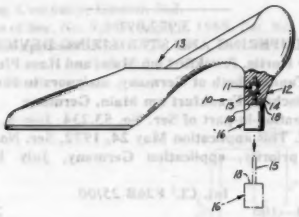
**3,977,095**

**BREAK-AWAY HEEL FOR SHOES**

**Esther M. Phillips, 1336 Straight Path, Wyandanch, L. I., N.Y. 11798**

**Filed Sept. 26, 1975, Ser. No. 617,196**
**Int. Cl.² A43B *21/36***
**U.S. Cl. 36—42** **3 Claims**




1. A break-away heel for shoes, comprising a heel fixedly secured to a shoe, magnetic spool means secured within said heel, a removable heel extension magnetically received on said heel of said shoe.

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**3,977,096**

**ATHLETIC SHOE**

**John C. Murray, 89 Bruce Avenue, Yonkers, N.Y. 10705**

**Filed Nov. 11, 1975, Ser. No. 631,166**
**Int. Cl.² A43B *23/28***
**U.S. Cl. 36—59 R** **6 Claims**

1. An athletic shoe of the type including a bottom portion for attachment of a spike plate, comprising, an attached spike plate defining a central opening, a recess defined by said bottom portion in the area proximate said attached spike plate, a cleaning member slidably inserted to said central opening and insertable to said recess, resilient means affixed to said cleaning member and said athletic shoe in said recess and spikes depending from said spike plate, said cleaning member normally protruding from said bottom portion by an

amount approximately equal to the amount by which said spikes depend from said spike plate and said recess extending into said athletic shoe by approximately the same amount.

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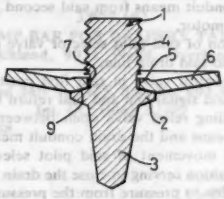
3,977,097

## DETACHABLE SPIKE ASSEMBLY FOR SHOES

Takeshi Ueda, No. 13-11, Kuruwa-cho, Isezaki, Gunma, Japan

Filed May 27, 1975, Ser. No. 581,414
Claims priority, application Japan, May 28, 1974, 49-60346
Int. Cl.[2] A43C *15/00*
U.S. Cl. 36—67 D 4 Claims




1. A detachable spike assembly for shoes comprising in combination:

a spike element having an integrally formed flange extending laterally intermediate the ends thereof, said spike element being provided with a threaded portion at one end thereof so as to be adapted for fastening to the sole of a shoe having a cooperable threaded portion;

an annular element rotatably secured to said spike element between said flange and said threaded portion having a central aperture smaller than both the lateral dimention of said flange and the external diameter of said spike thread portion and deformed to secure same to said spike element about a necked portion thereof; and

said necked portion being formed on said spike element adjacent said flange and having a diameter less than both the external diameter of the threaded portion of said spike element and the diameter of said aperture.

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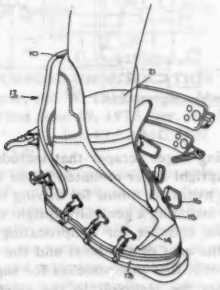
3,977,098

## SKI BOOT LINER HAVING ADJUSTABLE WIDTH SIZING

Edward L. Chalmers, Boulder, Colo., assignor to Garcia Corporation, Teaneck, N.J.

Filed Feb. 25, 1976, Ser. No. 661,031
Int. Cl.[2] A43B *7/20, 23/00, 19/00*
U.S. Cl. 36—89 12 Claims



1. A liner for an athletic boot having a semi-rigid outer shell, said liner comprising a pair of side panels which together substantially encase the foot and ankle of a wearer, pockets formed in each of said side panels along the ankle region of said liner, each pocket having a slit-like opening for positioning one or more inserts therein, and closure means to cover the associated slit-like opening, whereby the width sizing of said liner is adjusted by adding or removing inserts to or from said pockets.

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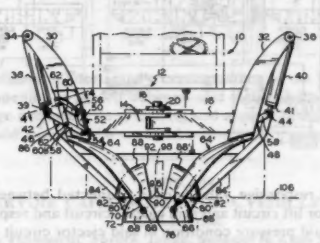
3,977,099

## NURSERY STOCKS DIGGING MACHINE

John E. Stewart, Gresham, Oreg., assignor to Nursery Implements, Inc., Gresham, Oreg.

Filed Dec. 16, 1974, Ser. No. 532,835
Int. Cl.[2] A01G *23/04*
U.S. Cl. 37—2 R 11 Claims



1. A nursery stocks digging machine comprising:

first and second support means for mounting upon a vehicle, and means for causing relative movement of said support means toward one another,

a parallelogram linkage pivotally connected to each support means and including control means for pivoting said parallelogram linkage with respect to each support means,

a first arm carried by said parallelogram linkage for movement constrained by said linkage to a direction parallel to components of said linkage,

a blade pivotally suspended from each first arm, each said blade having a rounded configuration between first and second pivot points of said first arm and curving downwardly in a downward position of said blade adapting said blade in said downward position to encompass a body of earth around a portion of the roots of a plant,

and a second arm connected to each said parallelogram linkage at a point of greater movement thereof than the movement imparted to said first arm, said second arm being connected to said blade at a third point thereon spaced from the first and second pivot points of said first arm wherein movement of said second arm rotates said blade about said pivot points when said first and second arms move downwardly.

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3,977,100

## HYDRAULIC CONTROL SYSTEM FOR ELEVATING SCRAPER

Richard F. Boersma, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Sept. 22, 1975, Ser. No. 615,249
Int. Cl.[2] B60P *1/36*
U.S. Cl. 37—8 14 Claims

1. In an elevating scraper:

a bowl having an end at which material is loaded and unloaded;

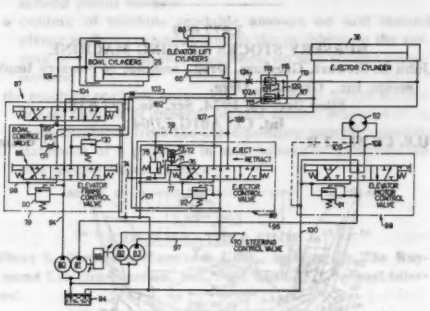
an ejector in said bowl;

an elevator at said end of said bowl;

a source of hydraulic fluid;

a hydraulic ejector circuit including a first hydraulic actuator operable to move said ejector toward said end to unload material from said bowl and a first valve independently actuatable to supply fluid from said source to operate said first actuator;

a hydraulic elevator lift circuit including a second hydraulic actuator operable to raise and lower said elevator and a second valve actuatable independently of said first valve to supply fluid from said source to operate said second actuator; and




pressure responsive valve means connected between said elevator lift circuit and said ejector circuit and responsive to a fluid pressure condition in said ejector circuit resulting from an increased load on said ejector when said first valve is actuated to move said ejector toward said bowl end and against material in said bowl while said second valve is not actuated to direct fluid from said source to said second actuator to raise said elevator.

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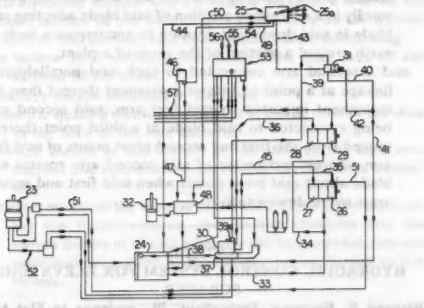
**3,977,101**

## AUGER CONTROL SYSTEM FOR A SCRAPER

**Edward J. Ohms, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Oct. 31, 1975, Ser. No. 627,826**
**Int. Cl.² B60P 1/42**
**U.S. Cl. 37—8** **3 Claims**



1. In a self-loading auger scraper that includes a tractor, a scraper articulately connected to the tractor through a hydraulic cushion hitch assembly, a scraper bowl, an auger mounted in the bowl, a hydraulic motor for driving the auger, a fluid reservoir, a first pump means for supplying fluid under pressure from said reservoir to the cushion hitch assembly, and second pump means for supplying fluid under pressure from the reservoir to the auger motor, control means for directing the output of said second pump means selectively to the auger motor or to the reservoir, said control means comprising, in combination:

a manually controlled pilot selector valve which has at least first and second positions;

an unloading relief valve;

a pilot operated normally open auger control valve;

a pressure conduit connecting the output of the first pump means to the pilot selector valve;

a pilot line from said pilot selector valve to the auger control valve;

a drain line from the pilot selector valve to the reservoir;

a signal line from the unloading relief valve to the auger control valve;

a return line from the auger control valve to the reservoir;

unloading conduit means from the second pump means to the unloading relief valve;

drain conduit means from the unloading relief valve to the reservoir;

and drive conduit means from said second pump means to the auger motor,

a first position of said pilot selector valve connecting said pilot line to said drain line,

said auger control valve in said first position being open between said signal line and said return line to maintain the unloading relief valve open between the unloading conduit means and the drain conduit means,

and manual movement of said pilot selector valve to a second position serving to close the drain line and subject the pilot line to pressure from the pressure conduit so as to close the auger control valve between the signal line and the return line,

closing of said signal line serving to close the unloading relief valve between the unloading conduit means and the drain conduit means,

whereby fluid from the second pump means goes through the drive conduit means to the auger motor.

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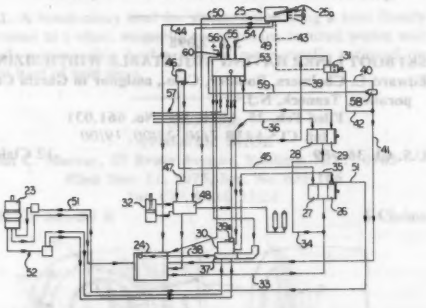
**3,977,102**

## LOAD EJECTION IMPROVEMENT FOR AUGER SCRAPERS

**Edward J. Ohms, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Oct. 31, 1975, Ser. No. 627,827**
**Int. Cl.² B60P 1/42**
**U.S. Cl. 37—8** **5 Claims**



1. In a self-loading auger scraper that includes a scraper bowl, a generally upright auger mounted in the forward portion of the bowl, a hydraulic motor for driving the auger, an ejector mechanism including a generally upright ejector member and a hydraulic cylinder for reciprocating the ejector member between the rear of the bowl and the front of the bowl, a fluid reservoir, first pump means for supplying fluid under pressure from the reservoir to the ejector cylinder, second pump means for supplying fluid under pressure from said reservoir to the auger motor, and a control system that includes a first manually actuated valve for directing the output of said second pump means selectively to the auger motor or to the reservoir and a second manually actuated valve which is movable between a first position in which fluid from

the first pump is blocked from the ejector cylinder and a second position in which such fluid flows to said cylinder to move the ejector member, means for driving the auger when the ejector member is operated comprising, in combination:

a drain line which is open to the reservoir when the auger motor is idle and which is closed to cause the output of the second pump means to be directed to the auger motor;

a first normally open valve in said drain line;

and means controlled by movement of the second manually actuated valve from its first position to its second position for closing said normally open valve.

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**3,977,103**

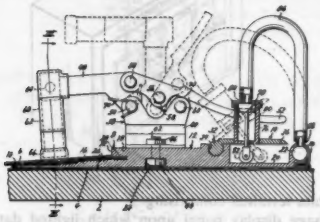
**CLAMP BAR FOR DRAPERY TABLES**

**Robert V. Strickland, 9021 Wedd, Overland Park, Kans. 66212**

**Filed July 9, 1975, Ser. No. 594,502**

**Int. Cl.² D06F *81/00***

**U.S. Cl. 38—108** **9 Claims**



1. A clamp bar for drapery tables comprising:

a. an elongated body portion adapted to be moved slidably over the top surface of a drapery table,

b. a series of clamps mounted in spaced relation along the length of said body portion, each operable to clamp an edge portion of a sheet of drapery fabric against said clamps, being selectively engaged or released by movement of an operating handle thereof in respectively opposite directions,

c. a release lever extending substantially the full length of said body portion and pivoted thereto on an axis longitudinal to said body portion, said release lever having an inoperative position in which it does not engage said clamp handles, and being movable to an operative position, during which movement it engages and moves all of said clamp handles to release all of said clamps, and

d. power means operable to move said release lever to said operative position.

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**3,977,104**

**MULTI-PURPOSE IDENTIFICATION TAG AND CLIP**

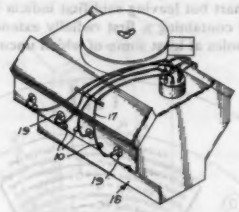
**John A. Stupar, 165 W. Larkspur St., Munhall, Pa. 15120**

**Filed June 19, 1975, Ser. No. 588,337**

**Int. Cl.² A44C *3/00***

**U.S. Cl. 40—2 R** **3 Claims**

1. An identification apparatus for selective application to and removal from the ignition wires of an internal combustion engine comprising a planar substantially circular body having generally parallel surfaces with selected indicia thereon, a pair of pliable arcuate sections connected at one end to one edge of said body and extending outwardly therefrom, said arcuate sections defining a substantially circular clip adjacent to said body, said clip having a generally circular opening extending therethrough along an axis generally normal to the plane of said surfaces of said body, the other end of said arcuate sections being spaced from each other a distance less than the diameter of said opening, a guide prong connected to said other end of each arcuate section and extending outwardly therefrom in the plane of said parallel surfaces, said guide prongs having flat diverging guide surfaces for guiding an ignition wire into said opening, whereby an ignition wire having a diameter substantially corresponding to the diameter of said opening is guided between said prongs without causing damage and said wire spreading said arcuate sections apart so that said wire may be received within said opening.



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**3,977,105**

**RESERVOIR CAP ASSEMBLY OF A VEHICLE MASTER CYLINDER**

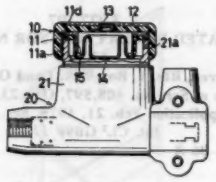
**Kaoru Tsubouchi, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan**

**Filed Nov. 20, 1974, Ser. No. 525,655**

**Claims priority, application Japan, Dec. 6, 1973, 48-139976[U]**

**Int. Cl.² G09F *3/02***

**U.S. Cl. 40—2.2** **1 Claim**



1. A cap assembly for a reservoir tank of a master cylinder assembly comprising,

a cap member detachably mounted on the reservoir tank and having a recess on the top surface thereof and a hole therethrough extending from the recess therein to the opposed side thereof,

a caution plate means disposed in the recess of the cap member and provided with a recessed portion on the bottom side thereof, and

rivet means, the head portion of said rivet means being secured in the recessed portion on the bottom surface of said plate and the leg portion of said rivet means passing through the hole in said cap member for securing said plate means in the recess of said cap member.

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**3,977,106**

**NUTRITION INDICATING DEVICE**

**Lois Kapp, 1127 E. Del Mar Blvd., Pasadena, Calif. 91106**

**Filed Dec. 12, 1974, Ser. No. 532,026**

**Int. Cl.² G09F *11/04***

**U.S. Cl. 40—70 R** **5 Claims**

1. A nutrition indicating device comprising:

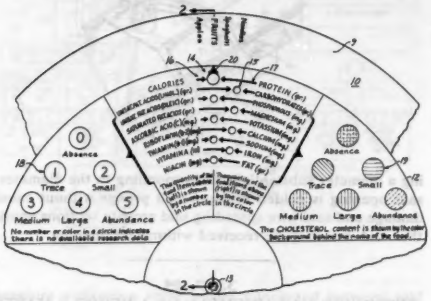
a chart and a wheel rotatably pivoted to the chart;

said chart comprising a first flat sheet containing on a side thereof, first indicia representing the names of a plurality of different foods arranged in spaced angular relationship to each other on a peripheral portion of the chart, and a plurality of radially oriented columns of second and third

indicia representing relative quantities of food items, each individual one of said second and third indicia representing the relative quantity of an individual one of the food items;

said wheel comprising a second flat sheet covering a portion of the chart but leaving said first indicia uncovered;

said wheel containing a first radially extending column of spaced holes at least some of which uncover elements of




both said second and third indicia and also a second radially extending column of spaced holes at least some of which uncover elements of both said second and third indicia; and

means indicating the food of the first indicia of the chart to be selected for registration with the wheel so that its said columns of holes uncover second and third indicia for the selected one of the foods represented in the first indicia.

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**3,977,107**

**ILLUMINATED DISPLAY BOX FOR NAVIGATIONAL AIDES**

**Carl D. Warren, Rte. 1, Box 99A, Land O'Lakes, Fla. 33539**

**Continuation of Ser. No. 408,597, Oct. 23, 1973, abandoned.**
**This application Feb. 21, 1975, Ser. No. 551,832**
**Int. Cl.² G09F *11/24***
**U.S. Cl. 40—86 R** **1 Claim**

1. An illuminated display box for displaying sequentially prepared navigational information for boat pilots, comprising

a box having a bottom, sides, ends and a top panel all sealingly attached together so as to form an opaque enclosure;

a rectangular display window in said top panel;

a pair of reversible spaced-apart rolls rotatably mounted in said box between the sides thereof in close association to said ends;

means for rotating said rolls;

an elongated sequentially arranged information-containing strip of translucent sheet material attached at its respective ends to said rolls and extending therebetween in underlying relation to said display window;

a pair of rail elements mounted in slightly spaced relation below said top to form a pair of channels respectively extending the full length of said window on opposite sides of said window, a pair of felt strips mounted on each side of said window with each of said channels in opposed face to face relation to form a strip engaging and light sealing track which sealingly engages the opposed marginal edges of the portion of the strip disposed below said window;

means subjacent the portion of the strip aligned with the window for supplying light within said box below said display window to permit information contained on said strip to be easily read in the dark without permitting light to escape from the box except through said strip portion and window.

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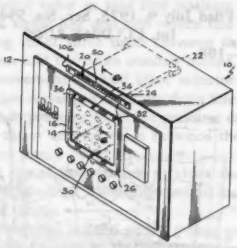
**3,977,108**

**DISPLAY APPARATUS FOR A DATA TERMINAL**

**Simon Yerkovich, Los Angeles, and Nicholas Vivian Parrillo, Studio City, both of Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Mar. 17, 1975, Ser. No. 558,747**
**Int. Cl.² G09F *13/10***
**U.S. Cl. 40—106.1** **10 Claims**



1. A data terminal comprising:

a message display panel upon which lighted data is displayed;

a card cartridge mounted in fixed relationship to the message display panel, the cartridge including a plurality of card compartments;

a plurality of format cards constructed from hingeless flexible sheets, are positioned in the card compartments, each card having transparent first areas and opaque second areas containing predetermined format indicia, the cards being individually extendable from the card cartridge; and

means for accurately positioning an extended format card with respect to the lighted data displayed on the message display panel so that the data may be viewed through the first areas and formatted by the indicia contained on the second areas.

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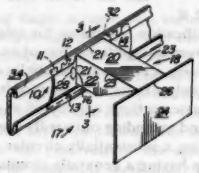
**3,977,109**

**FREEZER RAIL TALKER**

**Thomas L. Berry, Jr., Deerfield, and Kyle E. Mock, Mount Prospect, both of Ill., assignors to Litho-Paint Poster Company, Chicago, Ill.**

**Filed Mar. 3, 1975, Ser. No. 554,682**
**Int. Cl.² G09F *1/00***
**U.S. Cl. 40—124.1** **6 Claims**



1. An advertising display, blanked out from a single piece of flat stock and folded for spatially supporting a display tag from a mounting surface, comprising:

a. a base member having top and bottom edges;
b. a channel-shaped support arm having its web portion foldably connected at one end to the top edge of the base member and projecting outwardly therefrom with its flange elements substantially normal thereto; and
c. a display tag foldably connected to the support arm web at its free end to hang substantially normal to the longitudinal axis thereof.

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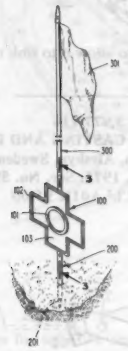
**3,977,110**
**DECORATIVE MARKER**
**Herman F. Yerger, 30 Ivy Lane, Glen Mills, Pa. 19342**
**Filed July 10, 1975, Ser. No. 594,667**
**Int. Cl.² G09F *19/00***
**U.S. Cl. 40—124.5** **3 Claims**



**1.** A rigid plastic decorative marker having a front decorative surface and a rear surface wherein the design of the decorative surface defines top and bottom edges of said marker, wherein mounting means on the rear surface comprises four bosses oriented perpendicular to the rear surface aligned along the vertical centerline of the marker, each boss having one aperture, wherein the apertures in the upper two bosses are concentric and sized to accommodate and support a removable flagstaff and wherein the apertures in the lower two bosses are concentric and sized to securely engage a ground support rod, the aperture, of the upper of the two lower bosses being sized to accept a self-threading ground support rod, and the aperture of the lowest of the two lower bosses being sized to allow the shaft of the ground support rod to be forcefit.

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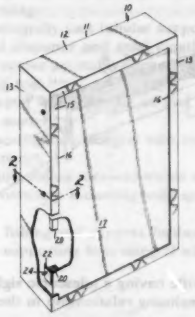
**3,977,111**
**SIGN STRUCTURE**
**Robert W. Fritts, Afton, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Aug. 21, 1975, Ser. No. 606,355**
**Int. Cl.² G09F *13/00***
**U.S. Cl. 40—132 R** **12 Claims**

**1.** A sign structure comprising means defining a generally closed housing for supporting a sign face and having a forward opening, a sheet, means supporting said sheet in a plane at the forward opening, and means defining a passageway from a region of laminar air flow into the housing to the rear of the sheet, said passageway having a total cross-sectional area greater than the combined area of any other openings in said housing for catching air at a pressure of the wind component against the front face and developing a pressure in the housing substantially equal to the pressure on the front surface of the sheet to develop a wind-induced counterpressure on the interior surface of the sheet to balance the net wind force acting on the front face of the sheet.



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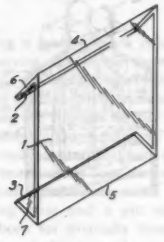
**3,977,112**
**DISPLAY DEVICE**
**Carl Breer, II, 1315 Second Ave., New York, N.Y. 10021**
**Continuation-in-part of Ser. No. 524,547, Nov. 18, 1974, abandoned. This application Jan. 22, 1975, Ser. No. 542,959**
**Int. Cl.² G09F *1/12***
**U.S. Cl. 40—152** **5 Claims**



**1.** A display device, comprising
a plate-like sheet of substantially rigid transparent material having a pair of spaced opposite substantially parallel edges and bent in the area of each of said edges along lines substantially parallel to and spaced from said edges to form a pair of lips each extending at a predetermined angle with the sheet of material in the area of a corresponding one of said edges, each angle opening toward the other, each of the lips being bent on itself along a line parallel to and intermediate the edge and the line at the juncture of the corresponding one of the lips and the remainder of the sheet to form a pair of trough-like configurations opposite each other and opening toward each other; and
adhesive means on corresponding surfaces of the lips.

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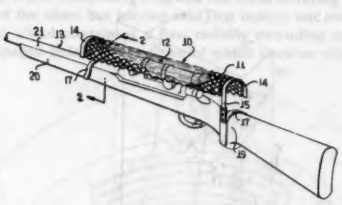
**3,977,113**
**SCOPE GUARD**
**Rufus J. Howell, Lot 43, S. Hillcrest, Whitehouse, Tex. 75791**
**Filed May 14, 1975, Ser. No. 577,607**
**Int. Cl.² F41G *1/38*; F41C *27/00***
**U.S. Cl. 42—1 S** **8 Claims**

**1.** A guard for a rifle-mounted telescopic sight comprising an inverted channel-like guard body having open ends and an open bottom and adapted to be placed over a sight to prevent

striking of the sight by another object, and a friction clip carried by each end of the guard adapted to snugly and frictionally engage a rifle having a telescopic sight to support the guard in spaced enclosing relationship to the sight.



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**3,977,114**

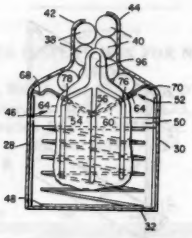
**RIFLE MAGAZINE**

Robert G. Poor, 1013 Hawk Drive, Sacramento, Calif. 95833

Filed June 18, 1975, Ser. No. 587,852

Int. Cl.² F41C 25/02

U.S. Cl. 42—50 9 Claims



1. In a generally rectangular, hollow cartridge magazine comprising a case having front and rear walls, a pair of side walls joined thereto and a bottom wall closing off the case and a top opening for discharging cartridges, a follower means in said case for supporting a plurality of cartridges, first spring biasing means in said case intermediate said follower and said case bottom wall for supporting and elevating said follower means, said follower means being of generally rectangular construction and defining a pair of generally rectangular plate members, said plate members being pivotally joined together over a contacting edge by a hinge.

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**3,977,115**

**ADJUSTABLE LINE FLOAT**

Axel Check, 5040 N. Lowell Ave., Chicago, Ill. 60630

Filed May 14, 1975, Ser. No. 577,217

Int. Cl.² A01K 93/00

U.S. Cl. 43—43.11 10 Claims

1. An adjustable line float including a float housing having means for connection to a primary fishing line, said housing including a floatation chamber at one end thereof and an open recess chamber at the other end thereof, a spool carrying an independent secondary line rotatably and removeably mounted in said open recess chamber with the free end of said secondary line connected to weighted means, and release means triggered when said float hits the water to release said weighted secondary line to allow it to sink to a predetermined depth.

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**3,977,116**

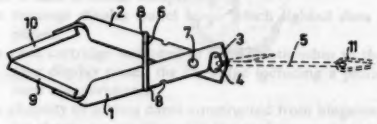
**SINKER FOR BAIT CASTING AND FLY-FISHING**

Ragnvy Berg, 3 Parkgatan, Alvsbyn, Sweden (94200)

Filed July 21, 1975, Ser. No. 597,778

Int. Cl.² A01K 95/00

U.S. Cl. 43—43.12 3 Claims



1. A sinker for fish baits and preferably such which, for example, are used for bait casting and fly-fishing, which sinker comprises two legs pivotally connected to each other, which legs at one end abut each other and are provided with recesses for retaining a bait-hook, the other ends of said legs being bent inwards toward a symmetry line between the legs and adapted to be spaced apart or moved together by the action of pressure forces from a stream flowing substantially in parallel with the symmetry line, said spacing apart taking place against the action of a resilient member attached between the legs.

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**3,977,117**

**FISHING ROD HOLDER AND HOOK SETTER APPARATUS**

Marvin L. Zahner, 421 N. Osage Drive, Skiatook, Okla. 74070

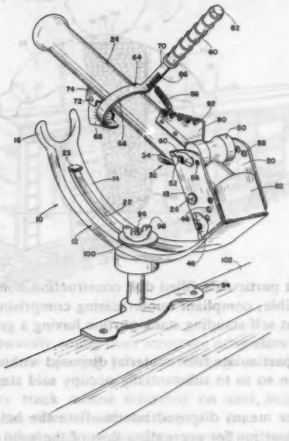
Filed Jan. 14, 1975, Ser. No. 540,844

Int. Cl.² A01K 97/10

U.S. Cl. 43—15 5 Claims

1. A combination fishing rod holder and fish hook setter apparatus comprising support frame means, tubular means pivotally secured to the support frame means for receiving one end of the fishing rod therein, trigger means having a pivot point carried by the tubular means and pivotally secured thereto for releasable engagement with the support frame means to provide a pressurized latch position for the tubular means in one position thereof, said trigger means pivot point being offset so that the trigger means is urged by gravity toward a latch position, adjustable dual torsion spring means provided on the support frame means for applying preselected pressure on the tubular means in the latched thereof, fish line receiving means carried by the trigger means and responsive to pressure of the fish line thereagainst for releasing the trigger means from the engaged position thereof with the support

frame means, and wherein said support frame means is provided with a nonmovable sear means for engagement with the trigger means to provide said engaged position thereof with the support means and wherein said trigger means is provided with a sear follower portion for guiding the trigger into a latched position with respect to the sear, and wherein said trigger means comprises a semi-circular portion concentric with and spaced from the outer periphery of the tubular means, a trigger member extending radially outwardly from one end of the semi-circular portion and pivotally secured to



the tubular means for selective engagement with the support frame means sear means, a line receiving element extending radially outwardly from the opposite end of the semi-circular portion for receiving a portion of the fish line therearound whereby pressure on the fish line is transmitted to the trigger member for releasing the engagement thereof with the support frame means, and tension spring means is adjustably secured between the fish line receiving element and the tubular member for varying the fish line pressure required for release of the trigger member from engagement with the support frame means.

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**3,977,118**

## FISHING ROD HOLDER WITH DOWN RIGGER ATTACHMENTS

**Laurence E. Seymour, 1239 Aline Drive, Grosse Pointe Woods, Mich. 48236**

**Filed Aug. 8, 1974, Ser. No. 495,662**
**Int. Cl.[2] A01K** *87/04*
**U.S. Cl. 43—21.2** **11 Claims**

**1.** A unitary combination in trolling equipment of a holder formed to removably support a fishing rod, and a trolling control device fixedly connected to said holder in close proximity to the latter, said device including a line receiving and pay-out spool having means directly supporting and rotatively journaling the same on said rod holder, said holder is a tubular one sized as to internal diameter and axial length to readily and removably receive yet stably support the hand grip portion of said fishing rod, said tubular holder having a movable latch member mounted thereon at one side thereof and actuable to releasably hold said spool in a rotatively set position, said line spool being carried by the rod holder at the same side of the latter as said latch member, said holder is a unitary casting including an upright tubular portion receiving said rod grip portion, and having integral boss formations thereon to rotatably journal the line spool, as well as to fixedly clamp an outboard rod member of a deep water down rigger unit of which said spool is a part.

**11.** In a trolling combination of a fishing rod support and a down rigger assembly having a line spool for playing out and receiving a down rigger line and a down rigger rod for supporting and guiding said line, an improved unitary fishing rod support comprising:

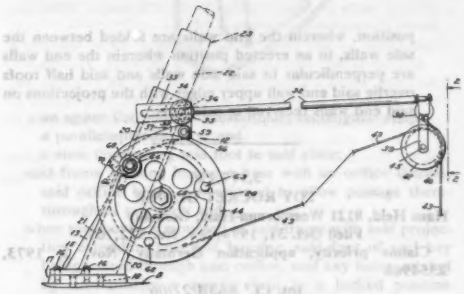
an upright integrally cast tubular support member sized as to internal diameter and axial length to readily and removably receive yet stably support the hand grip portion of a fishing rod;

a flange integral with the base of said tubular support for mounting same;

a spool-supporting boss integral with and transverse of said tubular support;

spool-mounting means received within said spool-mounting boss for rotatively mounting said spool to said tubular support;

said unitary fishing rod support further including a down rigger rod-supporting boss integral with said tubular support and having a front-to-back oriented bore for telescopically receiving and supporting the inboard end of said down rigger rod and means for securing said inboard end within said front-to-back oriented bore;



said unitary fishing rod support further including a latching arm for releasably locking said spool in a rotatively fixed position, a second boss integral with said tubular support and having a pin-receiving bore transverse of said tubular support and positioned on the same side thereof as said spool-supporting boss and a pin received within said pin-receiving bore for pivotally mounting said latching arm in operable relation to said spool;

said spool including at least one detent member extending from the side thereof, said latching arm including a hook portion for releasably engaging said detent member, and a manually engageable handle for selectively positioning said latching arm.

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**3,977,119**

## COLLAPSIBLE PLAYHOUSE MADE OF TWO EQUAL PARTS

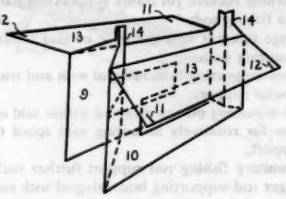
**Donald Carl Nelson, 312 Belmont Ave., Mount Pocono, Pa. 18344**

**Filed June 26, 1975, Ser. No. 590,481**
**Int. Cl.[2] A63B** *33/00*
**U.S. Cl. 46—12** **1 Claim**

**1.** A simple collapsible playhouse:

made of two equal parts, each said part comprising one rectangular side wall, two half end walls connected by fold lines at respective ends of said side wall and a half roof connected by a fold line to the upper longitudinal edge of said sidewall, each said half end wall having a bottom edge perpendicular to its associated fold line, an end edge substantially parallel to but longer than said associated fold line and a straight upper edge portion inclined upwardly from said associated fold line, said upper edge portion terminating in a short rectangular projection parallel to said end edge, said half roof having a free edge parallel to and longer than its associated fold

line, and having a slot at each end extending perpendicularly to said free edge; means permanently connecting both the end edges of said half end walls to one another so that the playhouse may be moved from a collapsed




position, wherein the end walls are folded between the side walls, to an erected position wherein the end walls are perpendicular to said side walls and said half roofs overlie said end wall upper edges with the projections on said end walls received in said slots.

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**3,977,120**

## TOY ROCKET GLIDER

**Hans Held, 8121 Wessobrunn-Haid, Germany**

**Filed Oct. 31, 1974, Ser. No. 522,705**

**Claims priority, application Germany, Nov. 2, 1973, 2354966**

**Int. Cl.² A63H *27/06***

**U.S. Cl. 46—74 R** **10 Claims**

**1. A rocket-powered glider of the type which during rocket-propelled flight climbs and which subsequent to the termination of rocket propulsion performs a gliding descent, comprising a fuselage having a center of gravity and a nose; a rocket outlet positioned on the fuselage so that, during at least the initial portion of climbing flight, said rocket outlet is located higher than the center of gravity to thereby exert upon the fuselage a first force tending to turn said nose downwards; and stabilizing means on said fuselage operative during but not after rocket-propelled climbing for exerting upon said fuselage a second force tending to turn said nose upwards, said stabilizing means comprising a stabilizing lifting member located rearwardly of said rocket outlet in the path of rocket exhaust gases so positioned and configurated that rocket exhaust gases impinge upon the stabilizing lifting member causing the latter to exert said second force during but not after rocket-propelled climbing, whereby when rocket burning terminates said second force decreases and permits gliding descent to begin.**

**3,977,121**

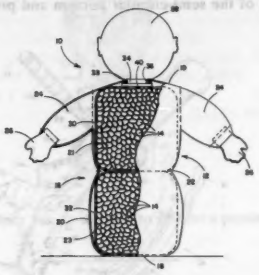
## DUAL COMPARTMENT DOLL

**Adolph E. Goldfarb, 4614 Monarca Drive, Tarzana, Calif. 91356, and Erwin Benkoe, 17965 Medley Drive, Encino, Calif. 91316**

**Filed Mar. 24, 1975, Ser. No. 561,270**

**Int. Cl.² A63H *3/00***

**U.S. Cl. 46—151** **15 Claims**



**1. A soft particulate filled doll construction comprising:**

**a. a flexible, compliant ouoter casing comprising a central upright self-standing stack portion having a generally flat lower end,**

**b. solid particulate filler material disposed within said stack portion so as to substantially occupy said stack portion, and**

**c. divider means disposed intermediate the height of said stack portion for preventing flow of the solid particulate material between an upper area of said stack portion disposed above said divider means and a lower area of such stack portion disposed below said divider means, the particulate material in the lower area being substantially heavier than the particulate material in the upper area.**

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**3,977,122**

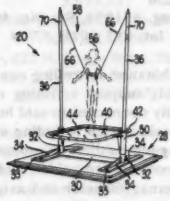
## DOLL ACCESSORIES

**Burton C. Meyer, Downers Groove; Palmer J. Schoenfield, Evanston, and Wayne Kuna, Oak Park, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.**

**Filed Apr. 25, 1975, Ser. No. 571,749**

**Int. Cl.² A63H *13/12***

**U.S. Cl. 46—130** **12 Claims**



**1. A trampoline accessory for use with a figure toy, comprising:**

**an upright support structure;**

**a trampoline device, including a sheet of flexible material, mounted on said upright support structure substantially below the top thereof; and**

**elongated flexible support means secured at one end to said upright support structure above the trampoline device and having engaging means at the opposite end therefor**

for securing to a figure toy to guide the figure toy as it is bounced off of the trampoline device.

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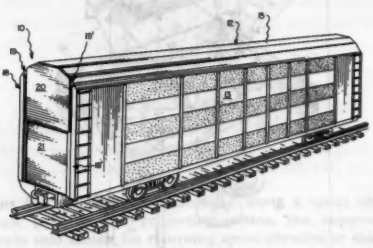
## 3,977,123
## UPWARDLY-ACTING DOOR STRUCTURE

Roy T. Clay, Jr., Snyder, and Lauren C. Whiting, Clarence, both of N.Y., assignors to Whiting Roll-Up Door Mfg. Corporation, Akron, N.Y.

Filed June 25, 1975, Ser. No. 590,384
Int. Cl.² E05F 17/00
U.S. Cl. 49—102 11 Claims



1. An upwardly-acting door structure adapted to selectively close an access opening provided through a body member, comprising:

stationary track means mounted on said body member along the sides of said opening;

movable track means movably mounted on said stationary track means for upward and downward movement between a lowered position and a raised position;

an upper panel mounted on said movable track means for movement therewith, said upper panel being adapted to close an upper portion of said opening when said movable track means is in said lowered position, and adapted to uncover said opening when said movable track means is in said raised position;

a lower panel mounted to move upwardly and downwardly along said movable track means, said lower panel being adapted to close a lower portion of said opening when said movable track means is in said lowered position, and adapted to uncover said opening when said movable track means is in said raised position;

interconnecting means operatively engaging said lower panel and said movable track means for causing said lower panel to move with said movable track means at a speed greater than that of said movable track means;

energy means operatively arranged to support the weight of said movable track means; and

actuation means selectively operable to cause said movable track means to move upwardly and downwardly,

whereby said actuation means may be selectively operated to move said movable track means between said lowered position at which said panels may close said opening, and said raised position at which said panels may uncover said opening.

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## 3,977,124
## MAN-HOLE ASSEMBLY

Jacques Oger, Pont-a-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Feb. 28, 1975, Ser. No. 554,327
Claims priority, application France, Apr. 19, 1974, 74.13678
Int. Cl.² E06B 3/32; E05C 21/02
U.S. Cl. 49—463 6 Claims

1. A man hole assembly comprising:

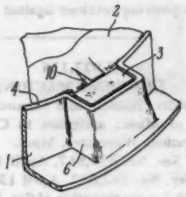
a man hole cover;

a man hole frame having an opening therein to receive said cover in a position closing said opening;

said frame having therein at least one outwardly recessed housing;

said cover having at least one outwardly extending projection, said projection extending into said housing when said cover is mounted in said frame to close said frame opening;

a locking key comprising:



an upper flat plate of substantially rectangular shape;

a parallelopipedic foot; and

a stem connecting said foot to said plate;

said frame housing having a base with an orifice therein, said orifice being dimensioned to allow passage therethrough of said foot; and

when said cover is mounted in said frame with said projection extending into said housing, said foot of said key being passed through said orifice, said key being rotated by substantially a quarter turn to a locked position whereat said cover is locked in said frame with edges of said upper plate against inner walls of said housing and said foot out of alignment with said orifice.

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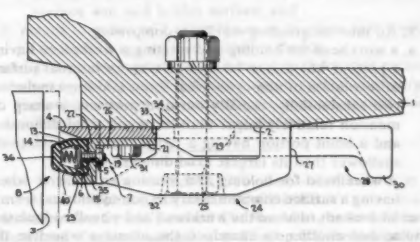
## 3,977,125
## DEVICE FOR SEALING STEEL DOORS OF COKE OVEN

Osamu Sudo, Fujisawa, Japan, assignor to Nippon Oil Seal Industry Co., Ltd., Japan

Filed Aug. 2, 1974, Ser. No. 494,364
Int. Cl.² E06B 7/22; C10B 25/06
U.S. Cl. 49—480 5 Claims



1. A device for sealing a steel door of a coke oven comprising: a ring-shaped steel packing fitted over an outer surface of the steel door so as to contact a side wall of the coke oven when the steel door is closed; a packing retainer fitted over and joined to the outer surface of the steel packing and provided with a ring-shaped groove opened toward the side wall of the coke oven; a ring-shaped packing assembly fitted into the groove so as to press elastically against the side wall when the steel door is closed, thereby sealing the steel door; the packing assembly extending closer to the side wall of the coke oven than the steel packing and comprising an elastic member having a front section and a rear section with a longitudinal opening, a spring retainer disposed within the elastic member

in contact with the inner side wall surface of the rear section and a plurality of springs loaded between the spring retainer and the inner side wall of the front section of the elastic member; the spring retainer comprising a bottom section in contact with the inner wall of the rear section of the elastic member and flange sections bent inwardly from both sides of the bottom section so as to retain the springs therebetween; each of the springs having a bottom coil of larger diameter than the remaining coils and the bottom coil being held between the flange sections of the spring retainer so that the remaining coils of the springs are spaced apart from each other; and a holder attached to the steel door for movably holding the steel packing and the packing retainer against the steel door.

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**3,977,126**

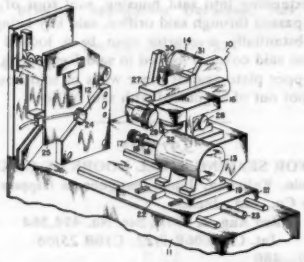
## GRINDING MACHINE

**Frederick A. Hohler, Holden, and Edmund E. Woldyka, Saxonville, both of Mass., assignors to Cincinnati Milacron-Heald Corporation, Worcester, Mass.**

**Continuation of Ser. No. 459,867, April 11, 1974, which is a division of Ser. No. 243,832, April 13, 1972, Pat. No. 3,842,543, which is a continuation of Ser. No. 85,777, Oct. 30, 1970, which is a continuation of Ser. No. 710,123, March 4, 1968. This application June 12, 1975, Ser. No. 586,308**

**Int. Cl.² B24C *3/00***

**U.S. Cl. 51—5 D** **5 Claims**



1. An internal grinding machine, comprising:

a. a workhead for holding and rotating a workpiece having a portion which is to be formed with an internal surface of revolution of non-cylindrical form, said form including two substantially, radially outward portions, a sharp dimension relatively larger than its largest axial dimension and a blunt portion having a radial dimension relatively shallower than its largest axial dimension,

b. a wheelhead for holding and rotating an abrasive wheel having a surface complimentary to non-cylindrical form,

c. feed means to move the workhead and wheelhead relative to one another to introduce the abrasive wheel to the workpiece for a plunge grind with a predetermined controlled force,

d. a dresser having an operative surface of the same non-cylindrical form located adjacent the workhead and wheelhead, the dresser being provided with a wheel having a surface of revolution of non-cylindrical form similar to that of the wheel, the wheel rotatably driven about the major axis of the surface of revolution, the wheel consisting of a matrix in which are embedded a number of diamonds,

e. automatic means serving to introduce the rotating abrasive wheel to the dresser while rotating the dresser in the opposite direction to that of the wheel for restoring the abrasive wheel accurately to the said non-cylindrical form after the said plunge grind.

**3,977,127**

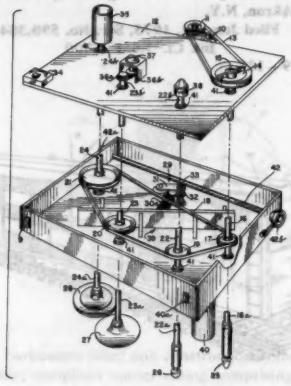
## MULTI-PURPOSE HOBBY FINISHING APPARATUS

**L. Wesley Mahnken, 1102 E. Eldarado, Decatur, Ill. 62521**

**Filed June 25, 1975, Ser. No. 590,201**

**Int. Cl.² B24B *27/00***

**U.S. Cl. 51—5 R** **6 Claims**



1. A multi-purpose craft finishing apparatus comprising:

motor means for driving said apparatus, said motor means bearing thereon motor pulley means;

motor belt means driven by said motor pulley means;

a plurality of shafts having proximal and distal ends, said shafts bearing thereon shaft pulleys, said shaft pulleys having diameters in the ratio of approximately 2:2½:3:4 respectively, one said shaft bearing a motor belt driven pulley means for driving said shaft by said motor belt means, said motor pulley and said motor belt driven pulley means having diameters in the ratio of approximately 1⅛ to 5;

brass drum preliminary sander means attached to said distal end of and driven by a first said shaft;

finishing brass drum sander means attached to said distal end of and driven by a second said shaft;

rubber disc sander means attached to said distal end of and driven by a third said shaft;

aluminum disc sander means attached to said distal end of and driven by a fourth said shaft;

connecting belt means releasably engaging said shaft pulleys for simultaneous driving said shafts;

idler means for drivably engaging said connecting belt firmly to said shaft pulleys;

tachometer means attached to and driven by one said shaft; and

speed control means connected to said motor means for adjustably maintaining, in cooperation with said tachometer means, one said shaft within functioning R.P.M. range, said pulleys being of such diameter that the R.P.M.'s of the other of said shafts will be automatically determined to be within functional R.P.M. ranges.

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**3,977,128**

## SURFACE TREATING APPARATUS

**James R. Goff, 6601 Shawnee Drive, Oklahoma City, Okla. 78116**

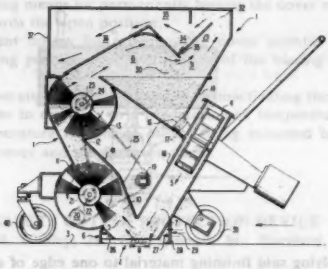
**Filed Apr. 21, 1975, Ser. No. 569,727**

**Int. Cl.² B24C *3/06***

**U.S. Cl. 51—9 M** **10 Claims**

1. In an abrasive throwing machine comprising an enclosure having an opening therein, sealing means around the periphery of said opening in said enclosure to contact a surface to be

treated and to retard the escape of spent abrasive from said enclosure, means within said enclosure for projecting abrasive particles along an incident path to a blast zne on said surface and from the blast zone along a rebound path, said projecting means being oriented to establish both said incident path and said rebound path at acute angles relative to said surface, and



means for returning spent abrasive along a spent abrasive recycle path to said projecting means, the improvement wherein said means for returning spent abrasive to said projecting means includes a rotatable means positioned in said rebound path for propelling spent abrasive particles along said recycle path.

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**3,977,129**

## GRINDING MACHINE

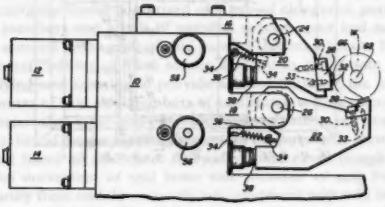
**Herbert Geoffrey Bottomley, Skipton, England, assignor to Landis Lund Limited, Keighley, England**

**Continuation of Ser. No. 469,515, May 13, 1974, Pat. No. 3,904,390, which is a continuation-in-part of Ser. No. 447,288, March 1, 1974, abandoned. This application Apr. 10, 1975, Ser. No. 566,763**

**Claims priority, application United Kingdom, Mar. 6, 1973, 10952/73; Oct. 10, 1973, 47214/73**

**Int. Cl.² B24B *5/04, 42/02***

**U.S. Cl. 51—105 R** **6 Claims**



**2. A cylindrical grinding machine comprising**

**means for supporting a workpiece for rotative displacement about the axis thereof,**

**a grinding wheel assembly including at least one grinding wheel and means for rotatively displacing said grinding wheel about the axis thereof,**

**a workrest jaw,**

**a spindle including a workrest jaw engaging portion at the end thereof, operatively associated with said workrest jaw,**

**means for rotatively advancing said spindle to advance said workrest jaw, and**

**means for non-rotatively advancing said spindle to advance said workrest jaw including means for preventing the operation of said rotatively advancing means.**

**3,977,130**

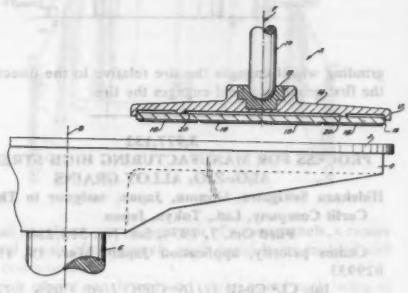
## REMOVAL-COMPENSATING POLISHING APPARATUS

**Raymond L. Degner, Mountain View, Calif., assignor to Semimetals, Inc., Mountain View, Calif.**

**Filed May 12, 1975, Ser. No. 576,846**

**Int. Cl.² B24B *7/04***

**U.S. Cl. 51—131** **15 Claims**



**1. An apparatus for polishing a workpiece surface comprising:**

**a. a substantially flat polishing device;**

**b. means to rotate said device about a first axis of rotation;**

**c. a rotatable assembly having a second axis of rotation located out of alignment with said first axis comprising:**

**1. a stiffly elastic mounting plate having first and second oppositely facing surfaces;**

**2. means to attach at least one workpiece to said first surface of said plate, said first surface being substantially flat;**

**3. a holder removably secured to and having a surface facing and spaced from said second surface of said plate;**

**4. at least one protrusion fixedly positioned between, and having a portion in contact with, said second plate surface and said holder surface; and**

**d. means to move said assembly so as to press said workpiece surface against said polishing device**

**said at least one protrusion forming plate deforming means whereby said plate is deformed into a curved configuration when said workpiece surface is pressed against said polishing device by said moving means.**

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**3,977,131**

## TIRE GRINDING MACHINES

**Eric Henry Searle, and Bernard Charles Allitt, both of Sutton Coldfield, England, assignors to Dunlop Limited, London, England**

**Filed Feb. 4, 1975, Ser. No. 547,039**

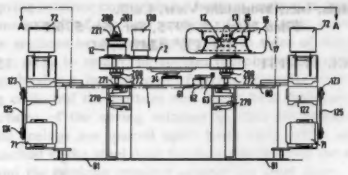
**Claims priority, application United Kingdom, Feb. 9, 1974, 06032/74**

**Int. Cl.² B24B *1/00, 5/00***

**U.S. Cl. 51—289 R** **24 Claims**

**1. A method for improving the uniformity of a pneumatic tire or tire and rim assembly comprising locating the tire or tire and rim assembly on rotatable mounting means, rotating the tire with the tread of the tire in engagement with a first rotating grinding wheel and grinding the tire to a first predetermined diameter, moving the rotatable mounting means to bring the tread of said tire into engagement with a second rotating grinding wheel, rotating the tire with the tread in engagement with the second grinding wheel and grinding the**

tire tread to a second predetermined diameter with the second grinding wheel, and reversing the direction that the second



grinding wheel engages the tire relative to the direction that the first grinding wheel engages the tire.

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3,977,132

## PROCESS FOR MANUFACTURING HIGH STRENGTH $Al_2O_3$-$ZrO_2$ ALLOY GRAINS

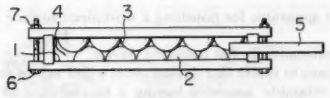
Hidekazu Sekigawa, Gunma, Japan, assignor to The Japan Carlit Company, Ltd., Tokyo, Japan

Filed Oct. 7, 1974, Ser. No. 512,236

Claims priority, application Japan, Mar. 18, 1974, 49-029933

Int. Cl.² C04B *31/16;* C09C *1/40;* C09K *3/14*

U.S. Cl. 51—309 A 4 Claims



1. A process for manufacturing high strength abrasive grains comprising (a) pouring a molten $Al_2O_3$-$ZrO_2$ alloy abrasive composition its $ZrO_2$ content of which is from about 15 to about 50 wt. % and which acquires needle-like crystal structure by freezing thereof into a mold set comprising two molds, one surface of each mold having hemisphere-like projections of the same size disposed regularly and closely to each other, the two molds being brought into contact with each other or within 5 mm apart from each other in such a way that the projections of one mold surface fit into the cavities between the projections of the other, (b) subjecting to cooling for freezing, (c) removing the frozen mass from the molds and (d) crushing the mass into abrasive grains.

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3,977,133

## METHOD OF FINISHING A FOIL

Oakley Cowdrick, 5079 Strawberry Lane, Willoughby, Ohio 44094

Division of Ser. No. 451,573, March 15, 1974, Pat. No. 3,863,399. This application Oct. 29, 1974, Ser. No. 518,776

Int. Cl.² B24B *1/00*

U.S. Cl. 51—328 10 Claims

1. A method for finishing the edge of a foil including the steps of,

supporting a foil so as to expose one edge thereof,

supporting a flexible finishing material on a support surface for finishing engagement with said edge,

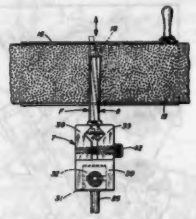
maintaining a portion of said finishing material away from said support surface,

yieldably applying said portion of said finishing material to conform said finish material to the configuration of said one edge,

moving said foil and said finishing material back and forth relative to one another generally in the lengthwise direction of said edge while applying said portion of said finishing material to said edge whereby said finishing material will conform to the configuration of said edge as said foil and said finishing material are moved relative to one another,

providing said finishing material in the form of a flat sheet,

supporting said finishing material on a support surface in spanning relation over a cavity formed in the support surface whereby said portion of said finishing material is supported away from the interior surface of said cavity,



applying said finishing material to one edge of said foil to urge said finishing material and said edge into said cavity, and

applying tension to said finishing material in a direction transverse to the direction of said one edge, to maintain said portion of said finishing material out of contact with said support surface and enable it to conform to the configuration of said edge as said finishing material and said foil move relative to one another.

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3,977,134

## VENT CLOSURE ARRANGEMENT

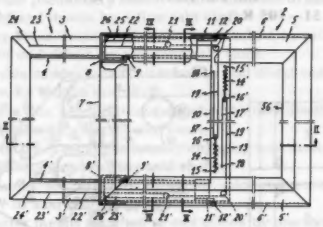
Pierre Emmanuel Eugene Jean Bogaert, Chalet du Dijk, 20, Wemmel, Belgium

Filed Feb. 28, 1975, Ser. No. 554,206

Claims priority, application Belgium, Mar. 14, 1974, 142001

Int. Cl.² E05F *15/20*

U.S. Cl. 52—1 8 Claims



1. A vent closure arrangement comprising

a. two first track members elongated in a common direction in transversely spaced relationship and two transverse members interconnecting respective ends of the track members, the four members extending in a common plane and defining a vent opening therebetween,

1. the track members defining first roller tracks;

b. a unitary cover member of substantially the same dimensions as the vent opening mounted for translatory movement in a plane parallel to the common plane in the common direction between a closing position wherein the cover closes the vent opening and an open position wherein the cover permits access to the vent opening, the cover member comprising

1. two second track members elongated in the common direction in transversely spaced relationship, the second track members defining second roller tracks,

2. two transverse members interconnecting respective ends of the second track members, and

3. a translucent cover mounted on the four members;

c. first rollers affixed to the cover member and engaging the first roller tracks, and second rollers affixed to the first track members and engaging the second roller tracks, the rollers being arranged for rolling along the tracks they engage for said translatory movement;

d. biasing means for permanently biasing the cover member towards the open position;

e. detent means for retaining the cover member in the closing position against the force of the biasing means; and

f. temperature responsive means for inactivating the detent means in response to a predetermined temperature, the temperature responsive means being mounted between the cover and the common plane.

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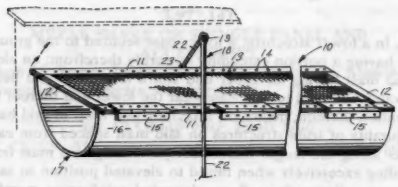
## 3,977,135
## SAFETY GUTTER PROTECTION DEVICE

Robert M. Hunley, Jr., 68 Plymouth St., Hartford, Conn. 06114

Filed Apr. 17, 1975, Ser. No. 569,191
Int. Cl.[2] E04D *13/00*
U.S. Cl. 52—12 3 Claims

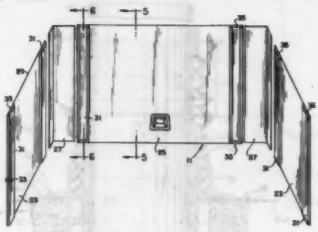


1. In combination with a house having sidewall and an overhanging roof with an eave, a safety gutter protection device, comprising an elongated horizontally disposed eaves trough positioned adjacent the eave extending underneath the overhanging roof portion above said eave, said eaves trough having spaced sidewalls and a bottom portion therebetween with the inner sidewall being disposed adjacent the sidewall of the house inwardly of and below the overhanging roof portion; a rectangular frame comprised of a pair of elongated, parallel side members and a pair of parallel, spaced apart end members secured to the ends of said parallel side members to form a central opening; a mesh screen secured to said frame and overlying said opening to provide a cover therefor, the inner and outer of said side members of said frame resting upon the corresponding inner and outer sidewalls of said eaves trough; a plurality of hinges pivotally mounting the outer side member of said frame to said outer sidewall of said eaves trough for pivotal movement of said inner side member of said frame upwardly from and downwardly into abutment with said inner sidewall of said eaves trough, the spacing of said eaves trough below said overhanging roof portion and from said house sidewall permitting sufficient pivoting of said frame to discharge leaves and the like accumulated on the surface thereof, said hinges being spring-loaded for normally urging said frame to bear downwardly against the inner sidewall of said eaves trough; mounting means on said frame adjacent the inner side member thereof; support means secured to the outer sidewall of said eaves trough and extending thereabove; and elongated flexible cable means secured to said mounting means upwardly to adjacent the upper end of said support means and thence downwardly outwardly of said outer sidewall of said eaves trough and therebelow, said flexible cable means when pulled downwardly manually pivoting the inner end of said frame upwardly from said eaves trough against the biasing pressure of said hinges for discharge of leaves and the like accumulated thereon.

## 3,977,136
## WALL PANELING

Phillip D. Daniels, West Bloomfield, Mich., assignor to Novi Plastics Company, Novi, Mich.

Filed Mar. 11, 1975, Ser. No. 557,271
Int. Cl.[2] A47K *3/16*
U.S. Cl. 52—35 9 Claims



1. Wall paneling comprising a pair of corner panels, a center panel and a pair of end panels, each panel being molded and of unit construction;

said pair of end panels and said center panel each being of uniform height;

the corner panels each having a pair of right-angular walls, of unequal length each of the other panels being flat on opposite faces with outwardly extending elongated marginal enlargements along their outer upright edges;

said enlargements terminating in edge flanges on one side and at the top and bottom thereof; the one enlargement of the end panels adjustably overlying and receiving therein the corresponding portion of one wall of a corner panel, with the end panel substantially coplaner therewith respectively; the outer enlargements of the center panel adjustably overlying and receiving therein the corresponding other wall portion of said corner panels respectively, and substantially coplaner therewith, said end panels extending at right angles to said center panel; and

adhesive means interposed between and securing said overlying portions of said end and center panel enlargements and the respective corner panel wall portion;

the edge flanges of said panel enlargements providing a snug sealing line contact with and along the corresponding underlying wall of an adjacent corner panel;

said corner panels being of slightly less height than the end and center panels so that the underlying wall portions of the corner panels are enclosed within the adjacent side, top and bottom edge flanges of the adjacent panel marginal enlargements.

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## 3,977,137
## ROOF VENT SUPPORT ARRANGEMENT

Francis Joseph Patry, Lewiston, Maine, assignor to Johns-Manville Corporation, Denver, Colo.

Filed June 30, 1975, Ser. No. 591,784
Int. Cl.[2] I04D *13/14*
U.S. Cl. 52—60 7 Claims

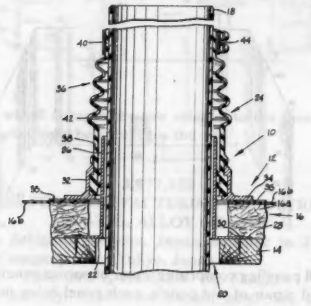
1. In a roofing system including a roof deck, a built-up roof thereon and a vent pipe extending through an opening in said deck and built-up roof, a vent support arrangement comprising:

a. a vertically extending tubular deck connector extending upwardly from the top surface of said deck directly over said opening such that said vent extends through said opening and said deck connector and beyond the top thereof, said deck connector including horizontal flange means located at its bottom end fastened to the top surface of said deck;

b. a vertically extending tubular vent connector having a bottom portion located concentrically around the outside

of the top end portion of said deck connector, said vent connector including horizontal flange means vertically spaced above said flange means of said deck connector such that said built-up roof is located therebetween;

c. means for connecting a top portion of said vent connector to a portion of said vent located above said deck connector; and



d. resilient means fixedly connected with the internal surface of the bottom end portion of said vent connector for allowing the top end portion of said deck connector to be readily inserted within said bottom end portion of said vent connector and, once inserted, for preventing its separation from said vent connector.

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**3,977,138**

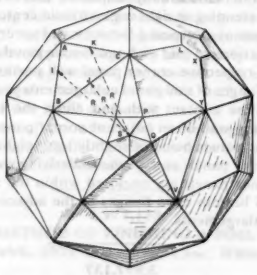
**SPACE ENCLOSURE**

**Lemuel J. Chastain, 446 Prospect Ave., Brooklyn, N.Y. 11215**

**Filed Apr. 16, 1975, Ser. No. 568,450**

**Int. Cl.[2] E04B 7/10**

**U.S. Cl. 52—81** **7 Claims**



1. A domelike space enclosure comprised of a plurality of polygonal planar panel members having at least one non-regular polygon and at least one other shaped polygon which is not the mirror image of the nonregular polygon, each of said panel members having a base side and at least two other sides, said panel members being adapted for assembly concentrically spaced about and approximating a spherical surface, said panel members being positioned for tangential intersection with said spherical surface at an intermediate point along each of the base and other sides of the respective panel members, said intermediate points defining an inscribed circle within each polygonal panel member with said circle being coincident with the spherical surface, each of said respective panel members having a thickness dimension with an edge thickness along the base side and other sides thereof being bevelled to provide companion mating edge surfaces between contiguous panels and forming a dihedral angle between said panels, said mating edge surfaces being coincident with a great circle plane passing through said spherical surface and tangent to the inscribed circle at said intermediate points whereby the linear dimensions of the sides and the dihedral angle between adjacent panel members are determinable for accurate interfitting between adjacent panel members thus effecting a weathertight seal and maximum structural rigidity.

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**3,977,139**

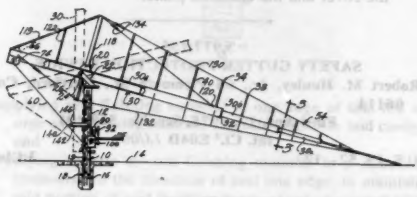
**TOWER HAVING RAISING AND LOWERING MEANS**

**Raymond S. Bryant, Rte. 1, Elko Road, Unadilla, Ga. 31091**

**Filed May 23, 1975, Ser. No. 580,313**

**Int. Cl.[2] E04H 12/34; E04C 3/02**

**U.S. Cl. 52—116** **9 Claims**



1. In a tower structure: a tower base secured to the ground and having a portion extending upwardly therefrom; an elongated mast having an upper end and a lower end and being movably attached to said base near the lower end thereof for elevation thereon; means for attaching said mast to said base, a plurality of truss structures on said mast spaced from each other along the length thereof for preventing said mast from bending excessively when raised to elevated position so as to prevent collapse thereof; an elongated reinforcing member attached to said mast near the attachment thereof to said base, a brace member extending outwardly from said mast between and in line with the reinforcing member and the end of the mast, said brace member being shorter than said reinforcing member, each of said trusses comprising an elongated perpendicular member substantially in line with said reinforcing member and said elongated members being progressively shorter from the reinforcing member toward the end of the mast, a rod member attached to said reinforcing member and to the brace member and to the lower end of said mast, a flexible member attached to all of said perpendicular members and to the upper end of said truss structures also including other truss members attached and extending at an angle from said perpendicular truss members, winch and cable means operable between said base and said mast for pulling on said mast about said attachment between the mast and the base to cause said mast to elevate; and means for securing said mast to said base after being raised to elevated position.

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**3,977,140**

**EARTHQUAKE RESISTANT STRUCTURE FOR SPHERICAL TANKS**

**Tadashi Matsudaira; Masaharu Kunieda; Takanori Kimura, all of Tokyo, and Shinya Nakano, Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha and Tokyo Gas Kabushiki Kaisha, both of Tokyo, Japan**

**Filed May 20, 1974, Ser. No. 471,202**

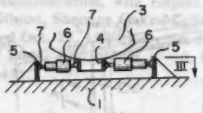
**Claims priority, application Japan, Feb. 21, 1974, 49-20840; Dec. 12, 1973, 48-139810; Feb. 21, 1974, 49-20839**

**Int. Cl.[2] E02D 27/34**

**U.S. Cl. 52—167** **2 Claims**

1. An earthquake resistant support for spherical tanks having a plurality of supporting elements interposed between a foundation and the bottom of the tank, a primary support means composed a plurality of legs fixed to the foundation and adapted to support the tank in spaced relation thereto, a

secondary support means comprising an inner, cylindrical supporting member attached to the bottom of the tank, an outer cylindrical supporting member spaced from said inner member and fixed to the foundation, brackets attached to the outer surface of the inner supporting member, brackets attached to the inner surface of the outer supporting member, dampening units disposed between the brackets, the ends thereof being attached to the respective brackets and pivotally connected thereto, the brackets including resilient means to cushion shocks caused by displacement of the joint between the dampers and the brackets.

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3,977,141

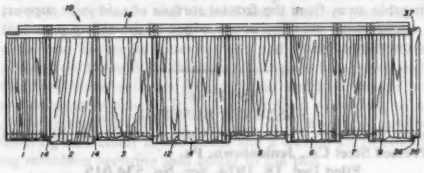
## METAL SHAKE OR SHINGLE PANEL AND ACCESSORIES

Robert M. Peters, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 23, 1974, Ser. No. 517,101

Int. Cl.² B44F 9/02; E04D 1/00

U.S. Cl. 52—313 7 Claims




1. A shingle or shake-like panel for fastening to a supporting surface, such as a wall or roof of a building, the panel comprising a plurality of adjacent, alternate, shorter and longer segments of alternately high and low elevations and varying widths made from sheet material in a bending and folding process, the low elevation segments being the longer segments and the high elevation segments being the shorter segments so that an equal amount of material is employed in making both the low elevation, long segments and the high elevation, shorter segments, the longer and shorter segments providing the panel with a staggered, forward or lower edge configuration, and having a plurality of longitudinally extending, triangular ridges of varying heights and slopes, said longer and shorter segments being separated by integral troughs, with each trough having a constant depth extending lengthwise of the segments, the forward or lower end of each segment terminating in a front wall having a return bend portion extending beneath the segments, the rear or upper edge of the panel terminating in a continuous, forwardly facing hook portion folded over the panel, the hook portion having an integral fastening flange extending rearwardly and downwardly toward the supporting surface for the panel.

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3,977,142

## FLOOR NAIL

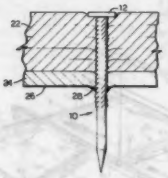
Allan B. Dove, Hamilton, and Allen C. Hunsberger, Waterdown, both of Canada, assignors to The Steel Company of Canada, Limited, Hamilton, Canada

Continuation-in-part of Ser. No. 454,595, March 25, 1974.

This application July 7, 1975, Ser. No. 593,318

Int. Cl.² E04C 3/16; E04B 5/52

U.S. Cl. 52—363 4 Claims




1. A fastener which includes a shank having a head on one end and a conical portion of circular section on the other, the apex of said portion constituting a piercing point for the fastener, the conical portion having a base diameter, the shank including a smooth cylindrical portion adjacent the conical portion, and a threaded portion adjacent the head, the axial section of the fastener exhibiting an abrupt, angled transition between the conical portion and the smooth cylindrical portion, the threaded portion having threads of which the outer thread diameter is greater than the diameter of said smooth cylindrical portion, the latter being the same as the base diameter of said conical portion, the thread angle of said threads being between about 35° and about 55°, such that the fastener is self-tapping and self-threading, the included cone angle of said conical portion being between about 23° and about 35°.

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3,977,143

## IMITATED JALOUSIE DOOR AND METHOD OF MANUFACTURING SAME

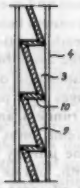
Karl Nilsson, Hjorted, Sweden, assignor to Aktiebolaget Tatebo Industrier, Hjorted, Sweden

Filed May 22, 1975, Ser. No. 580,024

Claims priority, application Sweden, May 24, 1974, 7406928

Int. Cl.² E06B 7/08

U.S. Cl. 52—473 11 Claims



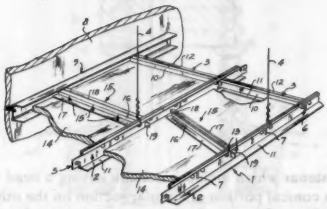

1. An imitated jalousie comprising a frame having a jalousie block mounted therein, said frame having a groove therein, said jalousie block including a base plate having opposed front and back surfaces and being constructed from a strong material which is resistant to bending and a thin foil of a bendable material bonded to each of said surfaces, said block further including V-formed cuts cut in said surfaces, each of said cuts disposed transversely to said groove and extending through the foil bonded to one surface and through the base plate but not through the foil of the opposed surface, said block being folded in a zigzag form and mounted in said groove in the frame, and means on said frame for maintaining said block folded in zigzag form, thereby providing a tight, solid jalousie unit.

3,977,144

## SUSPENDED CEILING STRUCTURE, PARTICULARLY FOR DRY-WALL TYPE PANELS

Martin D. Jahn, Riverside, Ill., assignor to Chicago Metallic Corporation, Chicago, Ill.

Filed Jan. 11, 1974, Ser. No. 432,469
Int. Cl.[2] E04B 5/52
U.S. Cl. 52—495 14 Claims



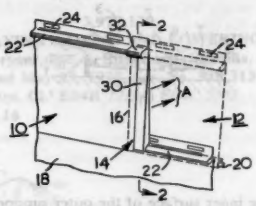
1. A suspended ceiling structure for supporting a plurality of rectangular sheet-like panels, particularly for relatively large dry-wall type panels having a sufficiently large area relative to their thickness that, when peripherally supported, the intermediate portion thereof would tend to sag out of its normal plane, comprising a suspended ceiling grid structure having a plurality of parallel main runners and a plurality of cross runners assembled therewith, to form a rectangular grid structure, each of said runners having an inverted T-shape in transverse cross section to provide a central web portion having outwardly extending panel-supporting flanges at the lower edge thereof, each pair of main runners and pair of cross runners assembled therewith defining a rectangular area, the long sides of which are defined by the main runners and the short sides of which are defined by the cross runners with said area having a size between oppositely disposed web portions of such assembled runners to receive a cooperable rectangularly shaped panel having respective lateral dimensions greater than the corresponding dimensions of said rectangular area, with the peripheral edge portions of the latter disposed adjacent such web portions and overlying and resting upon the associated flanges, said runners being so proportioned relative to the panel that the assembly of the respective panels may be effected subsequent to the assembly of the suspended ceiling grid structure, and a disposition of each panel in a position above the adjacent flanges of a pair of main runners and a cooperable pair of cross runners, and the lowering of the panel between said web portions onto such flanges for support thereby, and at least one unitary panel-reinforcing member longitudinally aligned with, and its ends substantially abutting the web portions of the adjacent main runners whereby the peripheral edge portions of the panel thereat are disposed between the flange of the adjacent main runner and the end portion of the reinforcing member, the latter having a vertically extending portion terminating at its lower edge in a horizontally extending flange seated upon the upper face of said panel, which flange extends substantially coextensive with the cooresponding dimension of the latter, at least one end of said reinforcing member having means disposed adjacent to and detachably interlocked with the adjacent main runner, restricting upward movement of said reinforcing member and said panel thereat, and means extending upwardly through the panel and into the planar portion of the reinforcing member to rigidly secure the intermediate portion of the panel to the planar portion of said reinforcing member to prevent sagging of the panel thereat.

3,977,145

## HORIZONTAL SIDING PANEL JOINT SUPPORT

Gerald B. Dobby, and David Henderson, Canada, assignors to Hunter Douglas International N.V., Curacao, Netherlands Antilles

Filed Mar. 26, 1975, Ser. No. 562,119
Int. Cl.[2] E04D 3/362, 3/366
U.S. Cl. 52—531 4 Claims



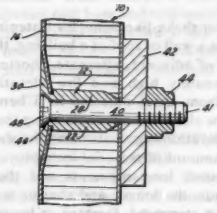

1. A joint support for supporting the overlapped ends of elongated horizontally disposed siding panels to prevent the formation of a gap at said joint, said joint support comprising an elongated piece of shaped sheet metal arranged to be disposed behind said joint with its longitudinal extent substantially vertical, said joint support including a major frontal surface and along each of its lateral edges a rearwardly extending flange, each of said flanges extending downwardly from a point near to but spaced from the upper end of said joint support to the lower end of said joint support, each of said flanges being substantially wedge-shaped with the thin part of said wedge-shape being adjacent the upper end of said flanges, the rearward extent of said flanges at the lower end thereof being cut away to a shape which is complementary to the upper longitudinal edge of the siding panels, the upper end of said joint support having a generally outwardly and downwardly extending portion having a shape complementary to the shape of the upper longitudinal edges of said siding panels, and said upper end of said joint support being spaced from and springable away from the frontal surface of said joint support for engagement over the upper edges of the siding panels at said overlapped joint.

3,977,146

## FASTENER BUSHING

Troyce W. Wiley, Costa Mesa, Calif., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Dec. 18, 1974, Ser. No. 534,019
Int. Cl.[2] E04B 2/28; E04C 2/34
U.S. Cl. 52—617 22 Claims



1. A fastener bushing for use in a panel structure consisting of at least one outer skin and a low density core having an opening extending through the core and skin, said fastener bushing comprising a shank adapted to be inserted in said opening; said shank having a longitudinal bore extending therethrough and an enlarged head formed at one end thereof adapted to overlie said outer skin when the shank is inserted in the opening; said shank having a groove formed therein about the periphery thereof before insertion into said opening

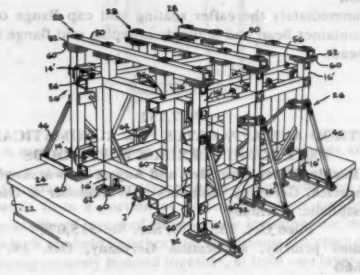
immediately below said head for receiving the edge portion of the outer skin about said opening when said shank is inserted therein, thereby to positively retain the fastener bushing in the panel.

3,977,147

## FLANGED MAJOR MODULAR ASSEMBLY JIG

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Meyer M. Gilman, Sherman Oakes, Calif.

Filed Oct. 25, 1974, Ser. No. 517,995
Int. Cl.² E04G 7/00; E04H 12/00; E04G 21/14
U.S. Cl. 52—648 14 Claims



1. In a three-dimensional framework which includes at least one set of elongated beam members having free ends projecting outwardly from the balance of the framework and terminating approximately but imperfectly in a common plane, such beam members being approximately parallel and roughly but imperfectly spaced from one another according to a predetemined pattern, the improvement comprising flanges secured to said ends of the set of beams, each said flange including a collar fixed to and surrounding one of said beams to partially receive the end thereof and a pad or plate fixed to said collar, each said pad being wider and longer than the collar and having an outer surface and an accurately formed center hole through its thickness, said pads being disposed so that their outer surfaces are co-planar and their center holes are accurately spaced from one another according to said predetermined pattern, a first set of connecting members securing said collar to the beam and a second set of connecting members securing said collar to the pad.

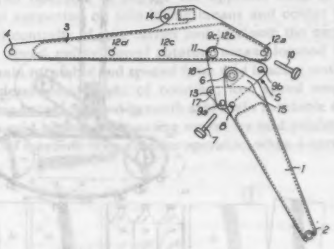
3,977,148

## JIB HAVING TWO ADJUSTABLE ELEMENTS

Daniel G. Ranini, Verreddes, France, assignor to Societe Anonyme: Poclain, Le Plessis-Belleville, France

Filed Jan. 10, 1975, Ser. No. 540,090
Claims priority, application France, Jan. 21, 1974, 74.01946
Int. Cl.² E04H 12/34; E04B 1/343
U.S. Cl. 52—721 4 Claims

1. A jib for a public works machine comprising, a first rigid element, a second rigid element, a connecting piece for connecting said first and second rigid elements, said connecting piece being rotatably mounted to rotate about a first axis on said first element, and a plurality of removable means for locking said connecting piece in a relatively fixed position to said first and second rigid elements, said connecting piece having a polygonal configuration and including a plurality of first holes formed therein disposed respectively adjacent the corners of the polygonal connecting piece, said second element having a plurality of second holes formed therein in a predetermined pattern separated from one another by distances equal to the distances between the first holes in said connecting piece taken in the order of continuous succession, said first rigid element having an opening formed therein located to align with one of the holes in said connecting piece and receiving one of said removable locking means whereby said connecting piece is secured to the first element and releasably held against rotation with respect thereto, and at least two of the first holes in said connecting piece being aligned with two of the second holes in said second rigid element and



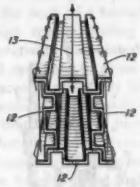
receiving two of said removable locking means respectively whereby said connecting piece is also secured to the second element and releasably held against rotation with respect thereto, to form a releasable rigid coupling between said first and second rigid elements

3,977,149

## MULTIPURPOSE CONSTRUCTION PANEL

Harvey H. Haynes, Camarillo, Calif., and Gene S. Guthrie, Springfield, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 28, 1975, Ser. No. 563,081
Int. Cl.² E04C 3/30
U.S. Cl. 52—731 5 Claims



1. A construction panel comprising a plurality of rigid U-shaped sections adjoined in abutting relationship such that the cross-section across the length thereof is in the shape of a square wave, said sections operable to be interfitted with U-shaped sections from similar construction panels to form large structures having right angle walls therein, all said U-shaped sections being of equal height, said square wave shape of said abutting U-shaped sections terminating at both ends with an edge member disposed horizontally with respect to the plane of said construction panel.

3,977,150

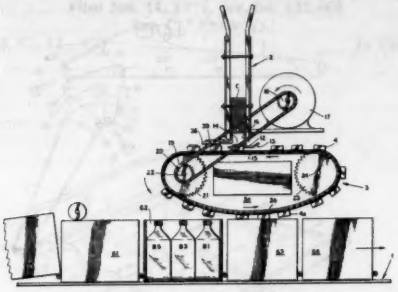
## MACHINE AND METHOD FOR SUPPLYING ARTICLE CARRIERS FOR APPLICATION TO GROUPS OF ARTICLES

Will Lester Culpepper, Tucker, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed July 21, 1975, Ser. No. 597,462
Int. Cl.² B65B 21/00
U.S. Cl. 53—3 10 Claims

1. A method of supplying article carriers in sequence for application to groups of articles, the method comprising the steps of arranging the carriers in inverted vertically stacked relationship, supporting the stacked inverted carriers on a

substantially horizontal carrier support bar mounted at one end only in cantilever fashion and with its free end extending in one direction, sequentially engaging the lowermost carrier and moving it in said one direction out of stacked relation with



its fellows and off of said support bar, temporarily retarding movement of each carrier relative to the associated applicator block to urge the carrier into firm and secure engagement therewith, and reinverting the carriers in sequence for application to groups of articles.

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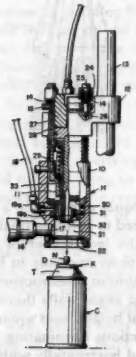
3,977,151

## MANUFACTURE OF AEROSOL PACKAGES BY UNDERCAP CHARGING WITH CARBON DIOXIDE PROPELLANT

Richard E. Reever, Streamwood, and George F. Dasher, Inverness, both of Ill., assignors to Alberto Culver Company, Melrose Park, Ill.

Filed Sept. 5, 1975, Ser. No. 610,575
Int. Cl.² B65B *31/00*
U.S. Cl. 53—12 10 Claims



1. The method of manufacturing an aerosol package for spraying a liquid composition using carbon dioxide ($CO_2$) as the propellant, said package including a container assembly comprising cylindrical container having a top providing an upwardly extending annular bead around a central opening therethrough, and a cap and valve unit mountable on said top, said cap having an annular downwardly concave flange seatable on said bead and adapted to be sealingly crimped thereto, comprising the steps of:

a. partially filling said container with a sprayable liquid composed essentially of ethanol together with not over 15% by volume of water, said liquid filling from 35 to 65% of the internal volume of said container, the rest of said can volume comprising a head space above said liquid composition;

b. evacuating the air from said container head space with said cap unit received on said container top but inseparable therefrom;

c. rapidly charging a metered quantity of $CO_2$ gas into said container at a pressure of from 500 to 800 psig, said gas lifting said cap unit and said gas flowing into said head space between said cap flange and said container bead, the total lift of said cap during said gas charging being limited to not over 0.23 inches, whereby violent turbulent intermixing of said liquid with said $CO_2$ gas occurs so that the $CO_2$ is almost instantaneously dissolved in said liquid; and

d. immediately thereafter seating said cap flange on said container bead and sealingly crimping said flange to said bead.

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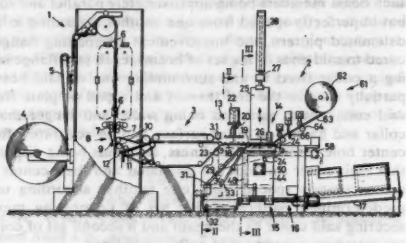
3,977,152

## METHOD AND APPARATUS FOR AUTOMATICALLY PACKAGING FLEXIBLE FLAT GOODS

Kurt Rochla; Horst Schneider, and August Schwarzkopf, all of Lengerich, Germany, assignors to Windmoller & Holscher, Westphalia, Germany

Filed Oct. 15, 1974, Ser. No. 515,070
Claims priority, application Germany, Oct. 19, 1973, 2352666
Int. Cl.² B65B *63/04*
U.S. Cl. 53—21 FW 29 Claims



1. In a method for packaging flexible flat goods such as bags, garbage sacks, or the like, wherein a horizontal stack is formed from the goods to be packaged and introduced laterally into an opened half tube of film and, whilst partially pressing the included air, welded therein by a separating weld seam which closes the open film edges and by a separating transverse weld seam extending perpendicular thereto to form bag packages, the improvement comprising the steps of: orienting the half tube of film into a vertical position with its open edges facing upwardly, moving the horizontal stack of goods to be packaged over the half tube, holding the half tube at its upper edges, pushing the stack from above into the vertically suspended half tube of film by exerting pressure from above the stack of goods onto its transverse centre line, folding the stack about the center line, while it is being pushed into the half tube of film, supporting the film at its lower edge, advancing the half tube of film by at least one width of a bag package to remove the portion of the film containing the stack and to position the following portion of film in readiness to receive a stack of goods, pressing out the air from between the stack that has been pushed into the half tube of film and the half tube of film, and closing the half tube of film by separating weld seams to complete the bag package while it is advancing.

## 3,977,153
## CONTAINER FOR FOOD PRODUCTS AND METHOD FOR MAKING SAME

Walter J. Schrenk, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 97,435, Nov. 6, 1970, abandoned. This application July 1, 1974, Ser. No. 484,528
Int. Cl.² B29D 9/00; B65B 7/00
U.S. Cl. 53—40 9 Claims

1. A method of making a food product container comprising:

a. forming a rigid container body having side and bottom walls from a portion of an original sheet comprising a plurality of layers of substantially incompatible materials which are held together in a contiguous structure without being securely bonded together, at least one layer providing structural support and at least one other layer providing high gas and water vapor barrier properties for said body;

b. separating remaining portions of said sheet after said body has been formed and removed from said original sheet into individual layers of scrap that can be recycled to form other said layers;

c. substantially filling said container body with a food product; and

d. sealably securing a closure to an upper peripheral edge of said container body by mechanically interlocking peripheral portions of said layers to hold them together.

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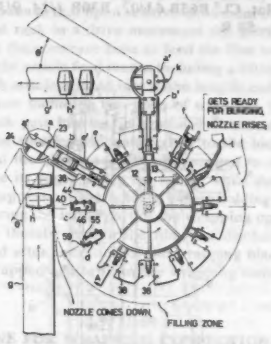
## 3,977,154
## AUTOMATIC CONTINUOUS BARREL FILLING METHOD AND APPARATUS THEREFOR

Makoto Kamisaka; Kanji Kojima; Tatsuya Negoro; Toshichika Uchikubo; Yusho Okamoto; Sadao Minato, and Toshio Shibata, all of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed May 14, 1974, Ser. No. 469,852
Claims priority, application Japan, May 24, 1973, 48-58438
Int. Cl.² B65B 3/14, 3/26
U.S. Cl. 53—59 R 6 Claims

1. An automatic continuous barrel-filling apparatus, comprising, in combination, a rotatable main turntable; a plurality of carrier means equiangularly spaced along the periphery of said main turntable to receive barrels one at a time and support the same temporarily; receiving means at a loading station adjacent said main turntable operable to receive and temporarily support empty barrels; receiving means at a discharge station operable to receive and temporarily support filled and bunged barrels; said main turntable being intermittently stepped through a predetermined angle of rotation to align one carrier means with said loading station to receive and support an empty barrel and to align another carrier means with said discharge station to discharge a filled and bunged barrel; respective nozzle means located above each carrier means operable to inject liquid into the empty barrels then supported thereon; rails extending radially of said main turntable between said main turntable and said loading station receiving means; a carrier mounted on said rails for reciprocation between said loading station receiving means and said main turntable; empty barrel lifting means on said carrier; means operable to move said carrier to said loading station receiving means for said lifting means to lift and support an empty barrel at said loading station receiving means, said reciprocating means then moving said carrier to the carrier means then aligned with said loading station for said lifting means to lower an empty barrel onto said carrier means on said main turntable; first barrel clamping means on said reciprocable carrier operable to engage the opposite ends of an empty barrel supported on said lifting means and center the empty barrel centrally of said carrier and to clamp the empty barrel; high speed empty barrel rotating means located beneath said main turntable and spaced from said loading station by said predetermined angle of rotation; low speed empty barrel rotating means located beneath said main turntable and spaced from said high speed rotating means by said predetermined angle of rotation; lifting means operable, when a carrier




means supporting an empty barrel is aligned with said high speed rotating means to lift said high speed rotating means to rotate the empty barrel at a high speed; second clamping means forming part of said speed rotating means operable to engage and clamp the ends of a barrel then operatively associated with said high speed rotating means; first bunghole sensing means operatively associated with said high speed rotating means and operable to sense when the bunghole of the empty barrel faces downwardly in alignment with a perpendicular to said main turntable to deactivate said high speed rotating means so that the empty barrel will come to a stop with the bunghole located at the second predetermined angle from said perpendicular; said lifting means of said high speed rotating means then lowering said high speed rotating means out of operative association with the empty barrel; second lifting means at said low speed rotating means operable, when the carrier means carrying the empty barrel is aligned with the low speed rotating means to lift the low speed rotating means into operative relation with the empty barrel to rotate the same at a low speed; third clamping means forming part of said low speed rotating means operable to engage and clamp the ends of an empty barrel then operatively associated with said low speed rotating means; means operable, to lower the nozzle means associated with the respective carrier means to engage the empty barrel being rotated by said low speed rotating means; control means associated with said nozzle means and operable, responsive to dropping of the nozzle means through the bunghole of the barrel then being rotated at a slow speed by said slow speed rotating means to deactivate said low speed rotating means; said second lifting means then lowering said low speed rotating means out of operative relation with the empty barrel; means operable to limit the extent of the projection of the nozzle means into the empty barrel; filling means operable to supply the liquid to the nozzle means to fill the empty barrel to a predetermined level; liquid level sensing means operatively associated with the nozzle means and operable to detect when the liquid level in the barrel reaches a predetermined level; means operable responsive to detection of said predetermined liquid level to inter-

rupt operation of said filling means; bunging means adjacent said main turntable in advance of said discharge station and spaced therefrom by said predetermined angle of rotation; said bunging means being operable to bung the filled barrel; and a second carrier reciprocable radially of said main turntable between a position beneath said main turntable and said discharge station receiving means to lift a filled barrel from a carrier means then at said discharge station and to deliver the filled barrel to said discharge station receiving means.

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**3,977,155**

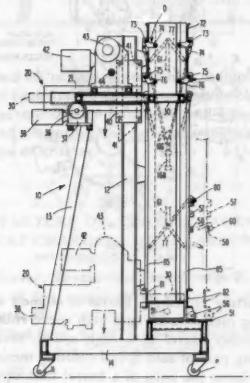
**BATT STACKER/LOADER**

**Harold E. Spaulding, Audubon, Pa., assignor to Certain-teed Corporation, Valley Forge, Pa.**

**Filed Nov. 12, 1975, Ser. No. 631,014**

**Int. Cl.² B65B** *63/02*; **B30B** *1/24*, *9/30*

**U.S. Cl. 53—59 R** **18 Claims**



1. Apparatus for stacking batts of compressible material, said apparatus comprising:

a. a main frame having a hollow rectangular shaft extending from top to bottom of said frame;

b. a carriage;

c. means supporting said carriage for vertical movement on said frame;

d. a platen supported for lateral movement in said carriage;

e. means for moving said platen laterally on extend said platen across said hollow shaft and to withdraw said platen from said shaft;

f. means for moving said carriage downwardly when said platen extends across said shaft and for moving said carriage upwardly when said platen has been withdrawn from said shaft;

g. means for delivering batts of compressible material to the upper end of said hollow shaft;

h. drop-gate means in said shaft near the upper end thereof for supporting a delivered batt when said drop-gate means is in closed position;

i. means for opening said drop gate means in response to delivery of a batt thereonto and for thereafter closing said drop gate means;

j. queue-gate means in said shaft near the upper end thereof spaced below said drop-gate means for supporting, when said queue-gate means is closed, one or more batts in stacked arrangment;

k. means for opening and closing said queue-gate means;

l. said queue-gate means, when opened, being adapted at start-up to drop said batts to the bottom of said shaft and being adapted when said platen extends across shaft to drop batts onto said platen

m. said platen, when extended across said shaft, being adapted when said carriage is lowered to compress a stack of batts in said shaft therebeneath.

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**3,977,156**

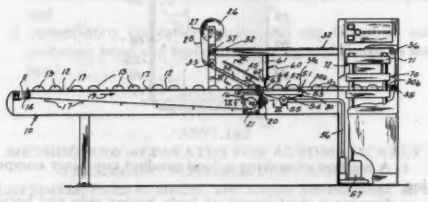
**SEQUENTIAL CYCLING SKIN-PACKAGING APPARATUS**

**Donald R. Rorer, 408 W. Hawthorne, Lake Bluff, Ill. 60044**

**Continuation of Ser. No. 451,010, March 14, 1974, abandoned. This application June 26, 1975, Ser. No. 590,705**

**Int. Cl.² B65B** *31/00*

**U.S. Cl. 53—112 A** **8 Claims**



1. A vacuum packaging apparatus comprising a generally horizontal conveyor for transporting sequentially step-by-step a plurality of porous product-supporting packaging substrates, a continuous strip thermoplastic film supply, a vacuum source, a fixed perforate vacuum packaging element support platen, means positively releasably connected to both sides of the film strip directing said film progressively step-by-step toward and longitudinally of the conveyor to a position thereover in face-to-face contact with said substrate positioned on said platen and held downwardly against the sides thereof, motor means for cyclically moving said conveyor, sensing means for sensing the positioning of a substrate on said platen, control means stopping said motor when said sensing means indicates a substrate is in position on said platen, and tucker means downwardly actuatable against said film to tuck said film against said substrate adjacent its trailing edge simultaneously with the connection of said vacuum source to said platen.

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**3,977,157**

**PACKING MACHINES**

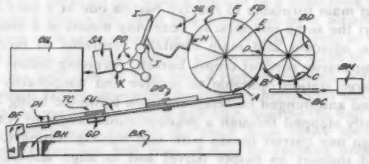
**Robert William Davies; Maxwell Francis Veness; Leonard Thornton, and Leonard Henry Calver, all of London, England, assignors to Molins Limited, London, England**

**Filed Feb. 19, 1974, Ser. No. 443,938**

**Claims priority, application United Kingdom, Feb. 16, 1973, 7858/73**

**Int. Cl.² B65B** *11/32*

**U.S. Cl. 53—207** **17 Claims**



1. Apparatus for packing an article in a packet including:

a. a rotatable member having a plurality of pockets,

b. means for intermittently rotating said rotatable member so that each pocket in turn is moved in steps along a path to an insertion position, to a loading position and to an ejection position;

c. supply means to feed packet blanks in succession to said insertion position adjacent said rotatable member;

d. inserting means for moving each successive blank at said insertion position into one of said pockets while said rotatable member is stationary and for performing folding operations on each blank to start its formation into a packet as it is moved into the pocket;

e. loading means for delivering an article into each partially formed packet at said loading position;

f. means for performing further folding operations on each partially formed packet while moving along said path between said loading position and said ejection position;

g. folding means for completing formation of the packets;

h. ejector means for pushing the partially formed packets out of said pockets at said ejection position into said folding means;

i. said inserting means including a cyclically movable support for conveying blanks one at a time past stationary folder members so that successive edge portions of the blank protruding from the support are folded by engagement with successive ones of the stationary members, said support comprising a platform having at least two relatively-movable portions, and drive means for moving each of said portions in timed relation to the movement of the other portion of portions so that initially both or all portions of the support are aligned to receive a flat blank and move said blank past a first stationary folder member disposed to engage and fold an edge portion of the blank projecting from one portion of the platform, whereafter said one portion of the platform stops while motion of at least one other portion of the platform continues past another stationary folder member disposed to engage and fold another edge portion of the blank projecting from said other portion of the platform; and

j. said folding means for completing formation of the packets includes a tubular member having walls defining an internal passage of such cross-section to permit a packet to pass through it with one face leading while engagement of flaps on said packet with said walls of said passage causes said flaps to be folded against side faces of the packet, and a counter-member movable through said passage in synchronism with movement of the ejector means and in advance of said ejector means by a distance equal to the thickness of the packet as measured perpendicular to said one face, said counter-member having a surface facing said ejector means for engagement with said one face of the packet to oppose distortion thereof during folding of said flap.

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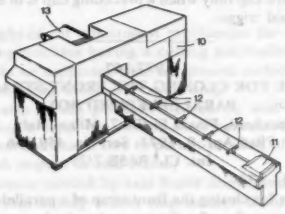
**3,977,158**

## WRAPPING MACHINE

**Robert Jennings, 47, Monmouth Close, Nod Rise, and Edward Henry Tew, 115, Kenilworth Court, Leamington Road, both of Coventry, England**

**Filed Sept. 13, 1973, Ser. No. 397,144**
**Int. Cl.[2] B65B *11/54***
**U.S. Cl. 53—226** **10 Claims**




1. A wrapping machine for wrapping articles in stretchable sheet material, comprising article feed means for feeding articles to a wrapping station, film feed means for feeding predetermined lengths of stretchable film to a wrapping station, holding means for holding the edges of the lengths of film at the wrapping station, a wrapping mechanism for wrapping said predetermined lengths of the film about the articles at the wrapping station, and discharge means for discharging the wrapped articles from the wrapping mechanism and securing the film lengths around the articles; the film feed means including two pairs of conveyor belts movable over guide and drive rollers carried on a frame movable in a feed and return movement by adjustable drive means, the belts being arranged at the sides of the lengths of film, one pair at each side, and the film being located between the belts of each pair, the holding means being urged against each pair of belts towards a fixed abutment so that the belts firmly engage the edges of the lengths of film and thereby resist the withdrawal of the film from the belts during the initial part of the wrapping operation, the drive means including a rack operatively connected to the drive roller so that upon relative movement between the frame and the rack in a drive movement the drive roller rotates to move the conveyor belts to feed the film to the wrapping station; the article feed means including a lifting platform on which each article is lifted into a film length; and the wrapping mechanism including two pairs of wrapping blades, the blades of each pair moving in opposite directions simultaneously to one another and transversely to the blades of the other pair and the blades each being arranged to engage the film and move its edges under the article while the article is at the wrapping station, the holding means holding the edges of the film during the initial part of the wrapping operation of the blades to thereby stretch the film, the discharge means being actuated after operation of the wrapping blades to discharge the wrapped article from the wrapping station.

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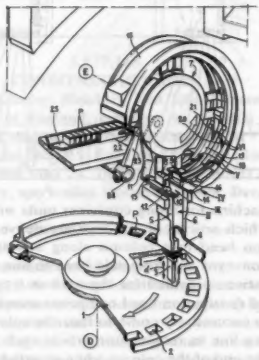
**3,977,159**

## MACHINE FOR WRAPPING CONFECTIONARY PRODUCTS

**Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy**

**Filed Nov. 8, 1974, Ser. No. 522,300**
**Claims priority, application Italy, Nov. 21, 1973, 3531/73**
**Int. Cl.[2] B65B *11/36***
**U.S. Cl. 53—234** **6 Claims**



1. A machine for wrapping confectionery products, comprising;

a wrapping head disposed to be moved intermittently in a rotary direction for wrapping individual confectionery products in individual pieces of wrapping material, one for each product;

means defining a channel for enabling delivery of the individual products, successively, to said wrapping head, to be wrapped; means defining a track for enabling delivery

of the individual pieces of wrapping material, one for and with each individual product, to said channel and through it to said wrapping head in synchronism with the products;

a plurality of peripherally distributed grippers on said wrapping head, disposed to cooperate with said channel for gripping each delivered individual product and for bending the respective individual piece of wrapping material into a U-shaped configuration about the product, thereby providing U-flaps of said piece laterally of the product;

folding members located adjacent said wrapping head at points angularly spaced from said channel, disposed to wrap each gripped product in a "soap" style wrap by further folding of the U-flaps, and including a plurality of pairs of folding blades disposed tangentially of said rotary direction, and, for each blade, a set of plate shaped folding members secured to the blade, spaced apart distances equal to the dimension of the product in a direction perpendicular to the plane of said rotary direction, and having a height similar to that of the product, radially of the wrapping head, for said further folding of the U-flaps; and

means angularly spaced from said folding members in said rotary direction for ejecting wrapped products from the grippers of the wrapping head.

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**3,977,160**

## MACHINE FOR FILLING CHOCOLATE-BOX TRAYS AND THE LIKE

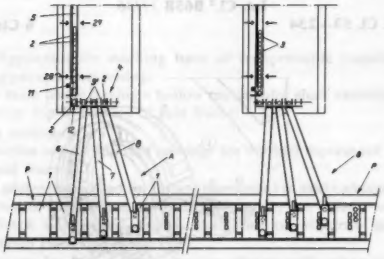
**Telesforo Klug, Porto-Ronco, and Armin Hofmann, Renens, both of Switzerland, assignors to SAPAL Societe Anonyme des Plieuses Automatiques, France**

**Filed Apr. 24, 1975, Ser. No. 571,388**

**Claims priority, application Switzerland, July 31, 1974, 10528/74**

**Int. Cl.² B65B 5/12**

**U.S. Cl. 53—240** **2 Claims**



1. A machine for filling container units with different articles, in which articles of one type are delivered to an article distribution head in a column along a waiting line from a loading conveyor and from said head to one of several distribution stations provided for the various types of articles, in which said distribution head comprises members mounted on a chain to successively come to face the column of articles in the waiting line to receive one article each time, means for holding the end of the column when an article has been taken up by a member, a mobile stop to retain said article in the member and separate it from the column, an extractor for removing articles from the members, channels for conveying the extracted articles towards the corresponding distribution station, means actuated by the extractor for moving the articles along said channels up to said distribution station, means for picking-up articles at the exit end of said channels and lowering the articles directly into the corresponding container unit, and a conveyor for conveying the container units below the distribution stations, and comprising a directly-linked kinematic chain of members providing a synchronized drive of said chain, said holding means, said mobile stop, said extractor, said pick-up means and said container-unit conveyor;

said means for picking-up and lowering articles directly into the corresponding container unit comprising a number of pick-up members equal to the number of places to be filled in the container unit, each pick-up member including means for suction-holding an article, said suction-holding means mounted on a jib which is movable vertically by a cam driven from the driving shaft of said container-unit conveyor, a direct liason being provided between the driving unit of said conveyor and the distribution head;

and said means for holding the end of the column of articles of the waiting line comprising a lateral block arranged to jam the next-to-last article against a wall of said line.

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**3,977,161**

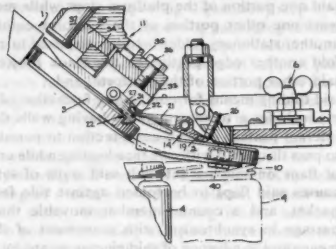
## CLOSURE CAP FEED CHUTE WITH AUTOMATIC CAP STOP

**Josef Faber, Lancaster, and Henry Wellington Moats, Rushville, both of Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio**

**Filed July 28, 1975, Ser. No. 599,825**

**Int. Cl.² B65B 7/28; B67B 5/00; B65G 11/12, 11/20**

**U.S. Cl. 53—313** **15 Claims**



1. In a cap feed chute for feeding a line of caps to moving containers an improved stop comprising the combination of:

a trigger positioned at the exit end of the chute for engaging the endmost cap for movement thereby;

means for mounting said trigger for movement by the endmost cap;

a latch for engaging one of the caps in the line of caps behind the said endmost cap;

means for movably mounting said latch rearwardly of said trigger;

means operatively coupling said latch to said trigger for movement thereby; and

said coupling being positioned whereby said latch engages a closure cap only when a preceding cap is in engagement with said trigger.

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**3,977,162**

## DEVICE FOR CLOSING THE FRONT STRAP OF A PARALLELEPIPED BOX

**Augusto Marchetti, Piazza Sicilia 7, Milan, Italy**

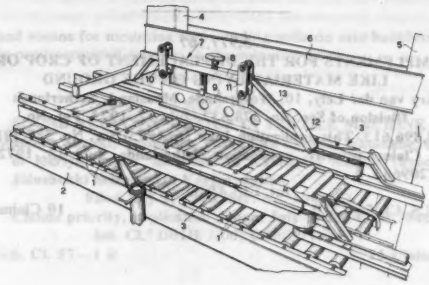
**Filed Apr. 9, 1974, Ser. No. 459,336**

**Int. Cl.² B65B 7/20**

**U.S. Cl. 53—374** **1 Claim**

1. Device for closing the front strap of a parallelepiped box, comprising a surface for the support and advancement of the box, an articulated parallelogram composed of an upper fixed horizontal side, a lower mobile horizontal side and two normally vertical connecting sides for said horizontal sides, a rotatable arm having its lower end hinged to the inlet end of said lower side of the parallelogram and a rigid rod hinged at its ends to said rotatable arm and to said upper side of the

parallelogram, said normally vertical sides of the parallelogram and said rigid rod being of such a length as to keep said lower side at rest at a distance from said support surface just less than the height of the frontal wall of the box and said rotatable arm in a position inclined upwards and towards the exit end of said support surface, and, following a horizontal



thrust exerted on the inlet end of said lower side of the parallelogram by the frontal wall of the box, allow said lower side to rise to a distance from said support surface just greater than the height of the frontal wall of the box and simultaneously allow said rotatable arm to rotate towards a position inclined upwards towards the inlet end of said support surface.

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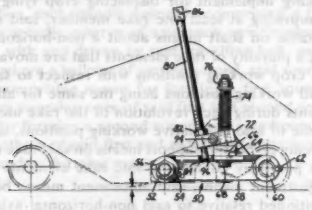
**3,977,163**

## MOWER-HEIGHT-OF-CUT ADJUSTMENT MECHANISM

**Paul H. Olin, Bloomington, and Allen D. Mathison, New Hope, both of Minn., assignors to The Toro Company, Minneapolis, Minn.**

**Filed July 14, 1975, Ser. No. 595,608**
**Int. Cl.² A01D *75/30***
**U.S. Cl. 56—7** **11 Claims**



**1. A height-of-cut adjustment mechanism for use with a lawn mowing machine having a cutting mechanism mounted in a frame to be supported above a ground surface by a pair of ground-engaging members, comprising:**

**a. pivot arm means pivotally carried by said frame and providing a supportive connection between one of said members and said frame to permit pivoting of said member with respect to said frame;**

**b. stop means carried by said frame above said pivot arm means and having a first stop surface thereon to limit pivotal movement of said pivot arm;**

**c. trigger means having a second stop surface thereon, said trigger means being operable in a first position to position said second stop surface below said first stop surface for contact with said pivot arm means, and in a second position, movable to allow said pivot arm means to contact said first stop surface;**

**d. spring means for urging said pivot arm means upward toward said stop means and urging said trigger means toward said first position; and**

**e. latch means associated with said trigger means and pivot arm means for preventing said trigger means from being urged into said first position while said pivot arm means is in contact with said first stop surface.**

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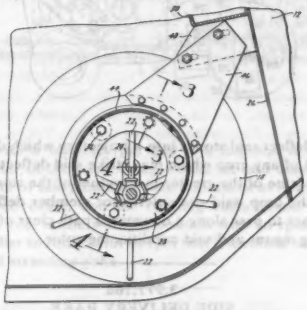
**3,977,164**

## CENTER SUPPORT FOR COMBINE TABLE AUGER

**Robert Ashton, Islington, Canada, assignor to Massey-Ferguson Industries Limited, Toronto, Canada**

**Filed Apr. 10, 1975, Ser. No. 566,846**
**Int. Cl.² A01D *57/00***
**U.S. Cl. 56—14.5** **5 Claims**



**1. A crop table and auger construction for combine harvesters comprising a table having bottom and back walls with end walls connecting them, an auger extending between and journaled in the end walls, a plurality of sets of retractable fingers at the mid-portion of the auger for propelling the crop off the table at the rear, means centrally and rotatably supporting the auger in spaced-relation to the table substantially mid-way between the end walls of the table, and a plurality of anti-friction rollers between the auger and the central supporting means.**

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**3,977,165**

## CONDITIONING CROPS

**Wilfred Erwin Klinner, Bletchley, and Alan Winston Harris, Hitchin, both of England, assignors to National Research Development Corporation, London, England**

**Division of Ser. No. 245,819, April 20, 1972, abandoned. This application May 24, 1973, Ser. No. 363,313**
**Claims priority, application United Kingdom, Dec. 8, 1971, 57064/71**
**Int. Cl.² A01D *84/00***
**U.S. Cl. 56—16.4** **9 Claims**

**1. A forage harvester comprising:**

**a conditioning rotor having conditioning elements extending outwardly therefrom for conditioning crop by rotation about a horizontal axis;**

**means for driving the conditioning rotor in rotation in a sense such that at the lowermost point of the movement of each said conditioning element the element moves in the same direction as the intended direction of forward travel of the implement;**

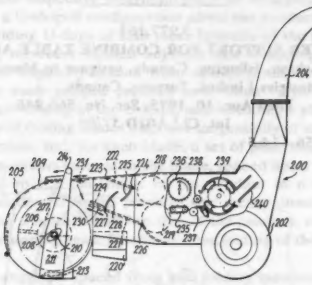
**mounting means for mounting the conditioning rotor in a position to collect crop during forward travel of the implement;**

**means on the harvester for chopping crop coming from the conditioning rotor;**

**hood means extending over and adjacent the conditioning rotor, the conditioning rotor co-operating with the hood means to effect a degree of separation of stones from crop**

by concentrating said stones in a peripheral path around the inside of the hood means; and

a stone deflector member extending downward from said hood means and positioned at least adjacent the rear of said conditioning rotor in the said peripheral path in a position such as to be struck by said stones and such as



to deflect said stones into a trajectory which differs from that of any crop which may strike said deflector member by virtue of the greater momentum of the stones relative to the crop, said stone deflector member deflecting said stones to pass along a downward path clear of said chopping means and said conditioning rotor.

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**3,977,166**

**SIDE DELIVERY RAKE**

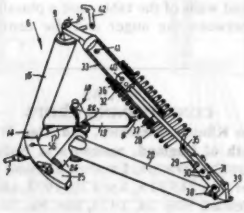
**Luis Delgado Delgado, Palencia, Spain, assignor to Vicon Espana S.A., Palencia, Spain**

**Filed Feb. 4, 1975, Ser. No. 547,037**

**Claims priority, application Spain, Feb. 8, 1974, 423,036**

**Int. Cl.² A01D *77/00***

**U.S. Cl. 56—366** **17 Claims**



1. A rake and attaching assembly therefor, comprising in combination:

an attaching frame adapted to be attached to a three-point tractor hitch, said attaching frame comprising a pair of members rigidly secured together to form a T configuration in which one member forms the stem thereof and the other member forms the arms thereof, first pivot means at the free end of said stem for pivotal attachment to one lower arm of the three-point hitch, second pivot means at the free end of one of said arms for pivotal attachment to the other lower arm of the three-point hitch, and third pivot means at the free end of said other arm for pivotal attachment to the upper member of the three-point hitch whereby said first and second pivot means define a horizontal transverse axis so that said stem inclines upwardly from said first pivot means at an acute angle with respect to the vertical and said other member inclines upwardly from said second pivot means at an acute angle with respect to the vertical;

said rake comprising a supporting frame and a plurality of rake wheels rotatably supported thereon, and a drawbar projecting forwardly from said supporting frame, said drawbar having a horizontal arm extending transversely to the axis of said drawbar; and

attachment means on said stem and said one arm for securing the opposite ends of said horizontal arm to said attaching frame.

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**3,977,167**

**IMPLEMENTS FOR THE DISPLACEMENT OF CROP OR LIKE MATERIAL LYING ON THE GROUND**

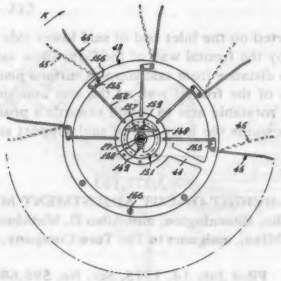
**Ary van der Lely, 10, Weverskade, Maasland, Netherlands**

**Division of Ser. No. 378,637, July 12, 1973, Pat. No. 3,896,613. This application June 16, 1975, Ser. No. 587,391**

**Claims priority, application Netherlands, July 13, 1972, 7209663**

**Int. Cl.² A01D *79/02***

**U.S. Cl. 56—370** **10 Claims**



1. A raking implement for displacing crop lying on the ground comprising at least one rake member, said member being rotatable on shaft means about a non-horizontal axis and having a plurality of rake elements that are movable into alternative crop working positions with respect to said axis, each of said working positions being the same for all of said rake elements during each revolution of the rake member in a chosen one of said alternative working positions, said rake elements being pivoted to support means on said rake member and means pivotably connecting said rake elements to ring-shaped adjustment means, said adjustment means being coaxially positioned relative to said non-horizontal axis and at least a portion of said adjustment means extending parallel to a plane perpendicular to that axis, said adjustment means being displaceably mounted on said member and movable lengthwise with respect to said axis, whereby all of said rake elements are moved from one of said working positions to an alternative working position when said adjustment means is moved lengthwise with respect to said axis.

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**3,977,168**

**MODULAR OPEN END SPINNING MACHINE**

**Richard A. Schewe, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.**

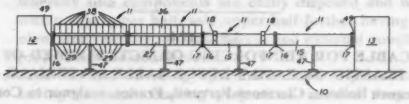
**Filed June 11, 1975, Ser. No. 585,968**

**Int. Cl.² D01H *11/00, 1/12***

**U.S. Cl. 57—1 R** **31 Claims**

1. A modular section to be inserted as a unit into an open end spinning machine, said section comprising an elongated rigid backbone, a plurality of open end spinning units, means

for mounting said spinning units on the backbone at predetermined spaced spinning stations, a plurality of winding units,



and means for mounting said winding units on said backbone in predetermined relation to the spinning units.

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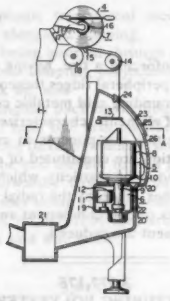
3,977,169

## SOUND REDUCING DEVICE IN TEXTILE MACHINE

Mamoru Suzuki; Yoshiharu Yasui, and Kenichi Watanabe, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed July 9, 1975, Ser. No. 594,433
Claims priority, application Japan, July 9, 1974, 49-79463
Int. Cl.² D01H *1/00*; G10K *11/04*
U.S. Cl. 57—1 R 11 Claims



1. A device for reducing sound produced by a textile machine including a travelling belt, and a plurality of spindle assemblies, each spindle assembly comprising a first section where a spindle wharve of said each spindle assembly is in contact with and driven by said travelling belt, and a second section where a balloon of yarn is formed, said sound reducing device comprising means for forming a first sound reducing boundary covering ones of said first and second sections, and means for forming a second sound reducing boundary covering the others of said first and second sections as well as said first boundary forming means.

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3,977,170

## STRANDING MACHINE FOR MAKING ELECTRIC CABLES

Guenther Sendlinger, Roth, Germany, assignor to Leonische Drahtwerke AG, Nurnberg and Kunststoff- und Kabelmaschinenbau GmbH & Co. K.G., Gruiten, both of, Germany

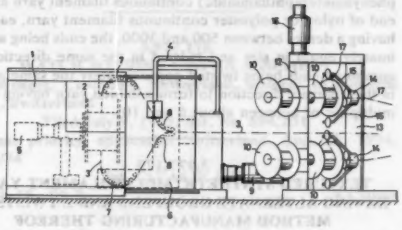
Filed Oct. 3, 1975, Ser. No. 619,315
Claims priority, application Germany, Oct. 5, 1974, 2447659
Int. Cl.² D07B *3/08*, *3/00*
U.S. Cl. 57—13 35 Claims

1. In a stranding machine for making cables, the machine having an operating direction and including a core wire supply reel having an axis coextensive with the operating direction; a plurality of strand element supply reels, each having a working position; and a take-up reel for receiving the stranded cable containing the core wire taken from the core wire supply reel and the strand elements taken from the strand element supply reels, the take-up reel having an axis coextensive with the operating direction, the improvement comprising

a. a rotatably supported stranding yoke having a rotary axis aligned with the axis of said take-up reel;

b. a plurality of rotatably supported fliers, individually associated with the working position of each said strand element supply reel; and

c. electric motor means for rotating said stranding yoke with a predetermined, constant rpm, for rotating said take-up



reel with a variable rpm that is a function of the coil diameter of the cable being wound on said take-up reel, the rpm of said stranding yoke and the twist length of the stranded cable, and for rotating each strand element supply reel in the working position with an rpm causing each flier to rotate with an rpm that is identical to the rpm of said stranding yoke.

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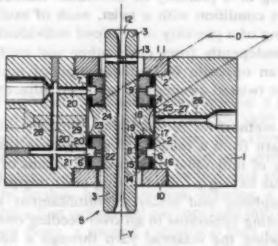
3,977,171

## FALSE TWISTING SPINDLE

Noboru Shindo, Maikata; Hiroshi Hashizume, Kyoto, and Shuichi Kikuchi, Nagaokakyo, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Aug. 1, 1974, Ser. No. 493,508
Claims priority, application Japan, Aug. 8, 1973, 48-89573
Int. Cl.² D01H *7/92*; D02G *1/04*
U.S. Cl. 57—77.3 4 Claims



1. A false twisting spindle comprising a turbine driven by air under pressure, said turbine including a hollow cylindrical shaft at the axis of rotation thereof and a turbine blade impeller having radially extending turbine blades on the outer periphery located centrally of the shaft, the diameter of the turbine blade impeller being determined in relation to the denier of a yarn to be twisted by the spindle, a twister pin extending transversely of the turbine shaft across the opening therein adjacent one end thereof, mounting means for the turbine including a body member and air bearings therefor rotatably mounting the turbine in the body member and means provided between the turbine and bearings for separating the air provided the air bearings and the air under pressure driving the turbine.

3,977,172

## REINFORCEMENT CORD

Jal N. Kerawalla, Greenville, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 6, 1975, Ser. No. 547,467
Int. Cl.² D02G 3/04, 3/26, 3/48
U.S. Cl. 57—140 BY 3 Claims

1. A cord for reinforcement of mechanical rubber goods comprising a cabled yarn of one or two ends of poly(p-phenyleneterephthalamide) continuous filament yarn and one end of nylon or polyester continuous filament yarn, each end having a denier between 500 and 3000, the ends being approximately equal in size and twisted in the same direction, the combined ends being twisted approximately the same amount in the opposite direction to form a cabled yarn having a twist multiplier of between about 6 and 10.

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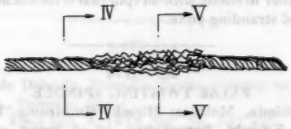
3,977,173

## TEXTURED SYNTHETIC MULTIFILAMENT YARN HAVING ALTERNATE GROUPED S AND Z TWISTS AND METHOD MANUFACTURING THEREOF

Kenzo Kosaka; Shin Morioka; Kunio Shibata; Takashi Goto, all of Nagoya, and Eizi Takahashi, Toyoake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 357,533, May 7, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,022
Int. Cl.² D02G 1/02, 3/34
U.S. Cl. 57—140 J 4 Claims




1. A synthetic multifilament textured yarn provided with a particular configuration comprising a plurality of compact portions and a plurality of bulky portions formed between two adjacent compact portions, said compact portions being randomly positioned along the longitudinal axis of the yarn and consisting of a plurality of individual filaments collected in compact condition with a twist, each of said bulky portions consisting of a plurality of crimped individual filaments positioned indepently from each other and each bulky portion having an opposite twisted direction of multifilament yarn from the twisted direction of said two adjacent compact portions.

4. A method for producing a synthetic multifilament textured yarn from a material multifilament yarn comprising a plurality of individual filaments, by means of a false-twisting apparatus having a false-twisting head comprising

1. supplying said material multifilament yarn to a false-twisting apparatus in an over-feeding condition,
2. passing the material yarn through a heating zone at a temperature within a range between the softening temperature and melting temperature of the yarn while maintaining said over-feeding condition, the individual filaments of the yarn being softened and partially melted such that the filaments are intermittently fused together to form random compact portions,
3. passing said material yarn in a heated condition through the false-twisting head, whereby random bulky portions are formed on the yarn after the yarn passes through the false-twisting head, and
4. taking up the resulting treated yarn delivered from the false-twisting head on a take-up device,

whereby a textured yarn is provided having a plurality of randomly distributed compact portions distributed along the longitudinal axis of the yarn and a plurality of bulky portions, each of said bulky portions consisting of a plurality of crimped individual filaments positioned independently from each other and each bulky portion having an opposite twisted direction of multifilament yarn from the twisted direction of the two adjacent compact portions.

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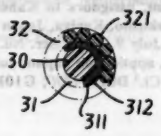
3,977,174

## CABLE FOR REINFORCING OBJECTS FORMED OF ELASTIC OR EASILY DEFORMABLE MATERIALS

Jacques Boileau, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, France

Filed Feb. 11, 1975, Ser. No. 549,064
Claims priority, application France, Feb. 12, 1974, 74.04790
Int. Cl.² D02G 3/48; D07B 1/10
U.S. Cl. 57—145 8 Claims




1. A cable for reinforcing a tire, having as components a metallic core free of peripheral ridges thereon and at least one peripheral layer surrounding said metallic core, each component being formed of elements, characterized by the fact that at least two consecutive components in contact with each other in radial direction are constituted of elements made of materials having moduli of elasticity which differ from one component to the other, whereby the radial contact pressures between the elements of one component and the elements of the adjacent component are reduced.

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3,977,175

## DRAW-TEXTURING POLYESTER YARNS

Hirofumi Yoshikawa, Iwakuni; Isao Hamana, Ibaraki, and Shiro Kumakawa, Iwakuni, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Dec. 9, 1974, Ser. No. 531,176
Claims priority, application Japan, Dec. 13, 1973, 48-138064; Apr. 3, 1974, 49-36915
Int. Cl.² D02G 1/02
U.S. Cl. 57—157 TS 19 Claims

1. A process for producing a textured yarn from a feed yarn consisting essentially of a synthetic substantially linear ethylene terephthalate polyester multifilament containing at least 85 mol % of ethylene terephthalate units, which comprises drawing and false-twist texturing the feed yarn at a draw ratio of 1.05 – 1.30X using a heating zone having a heat-setting temperature of about 170° – 240°C, said feed yarn having (a) a break elongation of 40–80%, (b) a density of above 1.371 g/cm³ and (c) a boil-off shrinkage of less than 8%.

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3,977,176

## ELECTRONIC WATCH STRUCTURE

Tomomi Murakami, Higashi Yamato, and Hiromichi Nagata, Higashi Murayamashi, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

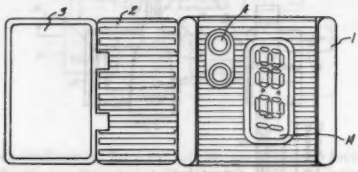
Filed Aug. 19, 1975, Ser. No. 605,921
Claims priority, application Japan, Aug. 22, 1974, 49-096335; Oct. 15, 1974, 49-117712; Sept. 18, 1974, 49-106788; Dec. 3, 1974, 49-138667
Int. Cl.² G04C 3/00; G04B 37/07; A44C 5/02
U.S. Cl. 58—23 BA 3 Claims

1. A watchcase for components of a digital electronic watch movement comprising:

a rectangular upper half, said upper half being injection molded in plastic, said upper half having internal posi-

tioning sections, recess and hooks molded therein for positioning and provisionally holding the components of said electronic watch movement in said upper half, whereby said components are easily disposed and held within said upper half, said upper half further having an elongated opening molded therein and external coupling projections molded thereon;

a back lid, said lid being injection molded in plastic and having external coupling projections molded thereon, said upper half being disposed on said back lid such that said external coupling projections on each are in an adjacent spaced apart configuration;



an elongated plastic transparent piece, said piece being fixed in said elongated opening;

a pin, said pin being inserted through at least one adjacent pair of external coupling projections on said upper half and said back lid; and

a resilient rectangular packing member, said packing member having at least one arm member made from a resilient, conductive flexible material, said arm member being coupled at one end thereof to said packing member and extending outwardly from said packing member, said packing member being clamped between said upper half and said back lid, whereby said arm member outwardly extends from said watchcase.

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**3,977,177**

## ELECTRIC ALARM WATCH

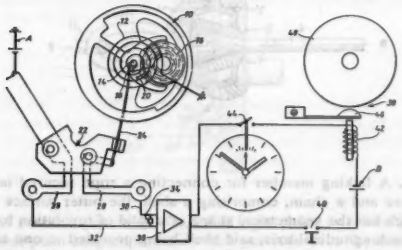
**Joseph Egger, Pforzheim, Germany, assignor to Timex Corporation, Waterbury, Conn.**

**Filed May 27, 1975, Ser. No. 581,390**

**Claims priority, application Germany, July 12, 1974, 2433560**

**Int. Cl.² G04B *23/12*; G04C *3/04*, *21/34*; G04B *39/00***

**U.S. Cl. 58—57.5** **8 Claims**



1. An alarm wristwatch, the combination comprising:

means for providing electrical control pulses;

an electromechanical oscillator means having a balance wheel unit with a balance drive coil affixed thereto which cooperates with a fixed permanent magnet;

alarm means having a switch device connected in series to an energy cell and settable to any particular time for alarm purposes, said switch device being also connected to the watch for activation thereby when the particular time occurs, a vibrator having affixed thereto a vibrator drive coil which is connected in series to said switch device, circuit means connected in series with said switch device and being controlled by said electrical control pulses for causing a pulsating current input to said vibrator drive coil which in response to said pulsating current input and in cooperation with said fixed permanent magnet causes said vibrator to vibrate against a watch crystal to produce an audible sound.

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**3,977,178**

## WATCH WINDING CROWN ASSEMBLY

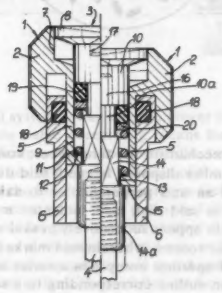
**Karl Wenger, Chambesy, Switzerland, assignor to Boninchi S.A., Switzerland**

**Filed July 9, 1975, Ser. No. 594,231**

**Claims priority, application Switzerland, Aug. 20, 1974, 11320/74**

**Int. Cl.² A63F *1/18***

**U.S. Cl. 58—90 B** **4 Claims**



1. A watch winding crown assembly comprising: a pendant tube; a crown body having an integral cylindrical skirt slidably and rotatably mounted in the pendant tube, said crown body having enlarged top end and a narrow skirt end with an inwardly-directed shoulder in the skirt towards said skirt end, the crown body further having means defining a central through bore with a first cylindrical part opening into said top end of the crown body, a second cylindrical part extending through said skirt, said second part being of lesser diameter than said first part, and a non-circular end part through said inwardly-directed shoulder; a push-button slidably mounted in said bore of the crown body, the push-button having a head axially displaceable in said first part of the bore, a cylindrical part axially slidably mounted and guided in said second part of the bore, a narrowed part including a non-circular portion keyed in said end part of the bore, and a terminal part wider than said end part of the bore and able to abut against said shoulder of the skirt to define an outermost position of the push-button in relation to the crown body; a spring mounted within said second part of the bore and acting against said shoulder and the push-button to bias the push button towards an outermost position relative to said crown body; a first annular seal between the pendant tube and the crown body; and a second annular seal between the push-button and said second part of the bore.

3,977,179

## DISPLAY MECHANISM FOR TIMEPIECES

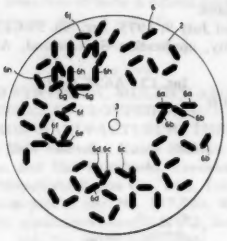
Peter Bachmann, Bettlach, Switzerland, assignor to Ebauches Bettlach S.A., Switzerland

Filed Apr. 22, 1975, Ser. No. 570,355

Claims priority, application Switzerland, May 6, 1974, 6152/74

Int. Cl.² G04B *19/16*

U.S. Cl. 58—128 8 Claims



1. A display mechanism for timepieces, comprising a dial, an indicator member disposed beneath said dial and adapted to rotate about an axis perpendicular to said dial, and an aperture made in said dial, said indicator member bearing marks intended to appear successively in said aperture as said indicator member rotates, wherein said marks form a series of indications, said aperture comprises a series of openings distributed along an outline corresponding to a superposition of all said indications, said outline is situated within an angle which has its apex at the center of said indicator member and is greater than an angle obtained by dividing 360° by the total number of said indications, and at least some of said marks intended to form two different said indications are intermingled, and wherein at least some of said marks are segments of the same size and shape as said openings.

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3,977,180

## AUTOMATIC CHAIN MANUFACTURING SYSTEM

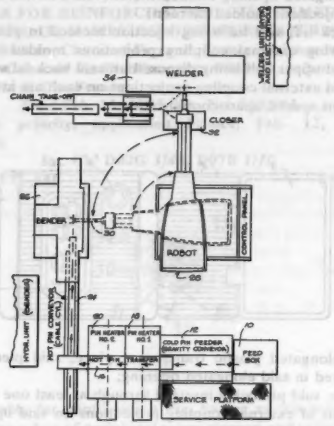
Richard L. Booth, Munster, Ind., assignor to S. G. Taylor Chain Company, Inc., Hammond, Ind.

Filed Aug. 7, 1975, Ser. No. 602,838

Int. Cl.² B21L *3/00*

U.S. Cl. 59—16 21 Claims

1. An automated apparatus for producing chain including means for holding a supply of pins, means for dispensing the pins one-at-a-time from the holding means, a heating station for individually heating the pins, transfer means adapted to pick up pins dispensed from the holding means one-at-a-time and adapted to deliver the pins to said heating station, conveyor means for receiving pins from the heating station, a bender, said conveyor means delivering pins to the bender, means for supporting pins at the bender and means for bending each pin into a link shape with spaced-apart ends, a robot for picking up link-shaped pins one-at-a-time and delivering the link-shaped pins to a welding station, a closer in the vicinity of said welding station for supporting a link-shaped pin delivered by the robot, a welder at said welding station and means for supporting a link-shaped pin in said welder for welding said ends together, means operating the robot to interlink a welded link with a link-shaped pin supported in the closer, and means for operating the closer to force said ends




together, said robot then delivering each link closed by the closer to said welder.

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3,977,181

## LINKING MEMBERS FOR CONNECTING A ROPE AND A CHAIN

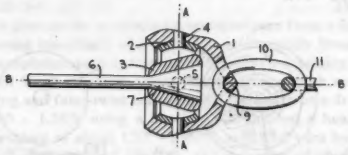
Knut Hilmar Ødegård, and Ivar Krogstad, both of Arendal, Norway, assignors to A/S Pusnes Mekaniske Verksted, Arendal, Norway

Filed Mar. 19, 1975, Ser. No. 559,774

Claims priority, application Norway, Mar. 21, 1974, 1010/74

Int. Cl.² F16G *13/18*

U.S. Cl. 59—93 6 Claims



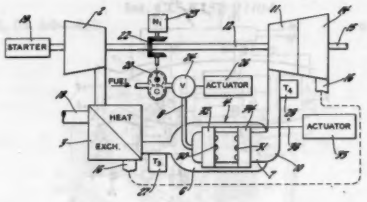

1. A linking member for connecting a rope secured in a sleeve and a chain, comprising a shell, the outer surface of which has the geometrical shape of a solid of revolution having a longitudinal axis, said shell being provided at one end thereof with means for the linking engagement of a link of the chain and being constructed at its other end with an opening for the free passage of the rope, an intermediate member being mounted in the interior of said shell by journalling means remote from said longitudinal axis for rotation about a first transverse axis perpendicular to the longitudinal axis of the shell, said sleeve being mounted in said intermediate member for rotation about a second transverse axis extending between said journalling means perpendicularly to said first transverse axis and to the longitudinal axis of a rope secured in said sleeve.

3,977,182

## GAS TURBINE CONTROL

Dennis E. Schroff, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed June 20, 1975, Ser. No. 588,696
Int. Cl.² F02C 9/08, 9/14
U.S. Cl. 60—39.27 6 Claims




1. A control system for a gas turbine gas generator including a combustion apparatus with burner variable geometry (BVG), the system comprising, in combination, means operative to derive a fuel-air ratio signal; means responsive to the difference between turbine inlet temperature and burner inlet temperature (BIT) effective to generate a burner temperature rise signal; means effective to generate a flame temperature rise signal responsive to the difference between a signal of the desired flame temperature and BIT; means effective to generate a signal of the desired ratio of primary air flow to total air flow by dividing the burner temperature rise signal by the flame temperature rise signal; means responsive to the said desired air flow ratio signal operative to derive a BVG signal; and actuating means responsive to the BVG signal operative to control burner variable geometry.

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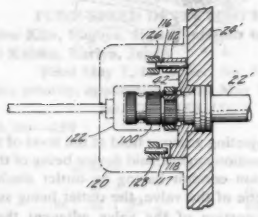
3,977,183

## ADJUSTING MECHANISM AND METHOD FOR FUEL CONTROL

Charles F. Stearns, East Longmeadow, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 6, 1974, Ser. No. 530,455
Int. Cl.² F02C 7/20
U.S. Cl. 60—39.02 7 Claims



1. Power input means for a fuel control for a turbine type power plant adapted to mate with a power lever in the cockpit of an aircraft powered by said power plant, a housing supporting the fuel control operative mechanism, said power input means including a shaft extending through a bore formed in said housing and operative to provide one of the input signals to said fuel control, the shaft having a relationship to the fuel flow controlled by said fuel control, means including an adjustment plate on said housing movable to calibrate said shaft for a given fuel flow at a given power plant operation, means providing a reference to which said power lever in said cockpit mates with said shaft, said means including a pair of mounting supports formed on said adjustment plate and spaced in axial alignment on opposing sides of said shaft, a predetermined portion on said shaft aligned in fixed relationship to said pair of mounting supports at a predetermined power plant operating condition.

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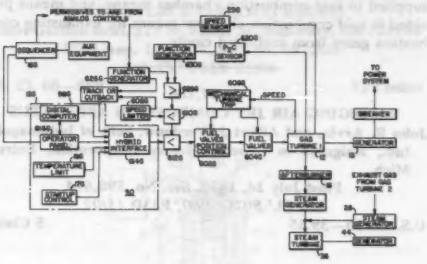
3,977,184

## ELECTRIC POWER PLANT HAVING A GAS TURBINE WITH AN IMPROVED WIDE RANGE SURGE PROTECTION SYSTEM

Jack R. Smith, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1974, Ser. No. 495,715
Int. Cl.² F02C 7/02
U.S. Cl. 60—39.18 B 21 Claims




15. A control system for an electric power plant gas turbine having a throttle valve comprising means for generating an electric fuel reference signal to control the turbine speed and load, means for controlling the position of the turbine throttle valve to control the flow of fuel to said gas turbine in response to the fuel reference signal from said speed and load controlling means, means for generating an electric signal representative of combustor shell pressure, and means for generating a surge limit signal in response to said speed and pressure signal generating means to limit the fuel flow and avoid compressor surge in accordance with a predetermined characterization.

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3,977,185

## APPARATUS FOR GENERATING HIGH-TEMPERATURE AND HIGH-PRESSURE GAS

Ryosaku Sawada, Nishinomiya, Japan, assignor to Kabushiki Kaisha Hanshin Gijutsu Kenkyusho, Japan

Filed June 6, 1974, Ser. No. 476,877
Claims priority, application Japan, June 6, 1973, 48-64289
Int. Cl.² F02C 5/00, 7/00
U.S. Cl. 60—39.55 13 Claims

1. An arrangement for generating a high temperature and a high pressure gas, the arrangement comprising: a casing, a combustion chamber means provided in said casing, means for supplying a fuel-air mixture to said combustion chamber means, means for supplying water to said combustion chamber means, a rotor means rotatably mounted in said combustion chamber means in hermetical sliding contact with a peripheral wall of said combustion chamber means, means for driving said rotor means, a first cavity formed in a circumfer-

ential surface of said rotor means for receiving the fuel-air mixture, means for igniting said fuel-air mixture received in said first cavity to form a high-temperature and high-pressure combustion gas, means communicating with said combustion chamber means for receiving said high-temperature and high-pressure combustion gas from said first cavity, a second cavity formed on a circumferential surface of said rotor means spaced from said first cavity in the direction of rotation of said rotor means for exclusively receiving an additional supply of air, means provided in said combustion chamber means for exhausting combustion gas from said second cavity, means for supplying water to said combustion chamber means, a third cavity formed on a circumferential surface of said rotor means spaced from said first and second cavities in the direction of rotation of said rotor means for exclusively receiving the water supplied to said combustion chamber means, and means provided in said combustion chamber means for exhausting combustion gases from said third cavity.

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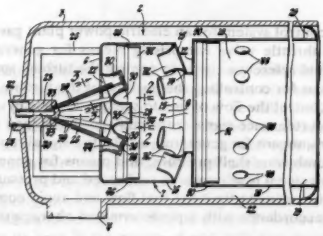
**3,977,186**

## IMPINGING AIR JET COMBUSTION APPARATUS

**John R. Arvin, and Albert J. Verdouw, both of Indianapolis, Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed July 24, 1975, Ser. No. 598,674**
**Int. Cl.² F02G *3/00*; F23D *15/02***
**U.S. Cl. 60—39.65** **5 Claims**



1. A combustion liner comprising a head wall; side wall means extending downstream from the head wall to a combustion products outlet, the head wall and the upstream portion of the side wall means bounding a reaction zone, and the downstream portion of the side wall means bounding a dilution zone; and a plurality of pairs of nozzles providing air entrances into the reaction zone, the nozzles of each pair being substantially coaxial and oppositely directed, each pair comprising a first nozzle extending downstream from the head wall and a second nozzle extending upstream from the side wall means, the first nozzle having an outlet farther from the adjacent portion of the side wall means that is the outlet of the second nozzle; and means for mixing fuel into the air flowing through one nozzle of each pair.

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**3,977,187**

## DEVICE FOR DETECTING EFFECTIVE OPERATION OF THE REHEAT SYSTEM OF A TURBO-JET ENGINE

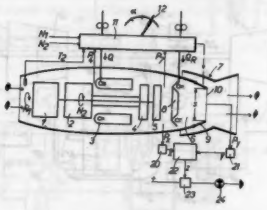
**Roger Guillaume, Brie-Comte-Robert, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France**

**Filed Apr. 17, 1974, Ser. No. 461,692**
**Claims priority, application France, Apr. 26, 1973, 73.15139**
**Int. Cl.² F02K *3/08***
**U.S. Cl. 60—233** **2 Claims**

1. In a turbojet engine having a turbine connected through a reheat duct equipped with a reheat system to a jet propulsion nozzle having a throat area of minimum cross-section, a detection device for informing whether or not said reheat system is actually in operation, comprising:

means for generating a first signal as a function of the gas flow pressure in said reheat duct,

means for generating a second signal as a function of the static pressure at said throat area minimum cross-section, and



differential signal sensing means having two inputs to which said first signal and said second signal are respectively applied, said differential signal sensing means being responsive to excess over a predetermined threshold value of the difference between said first and second signals, to issue an output signal materializing actual operation of said reheat system.

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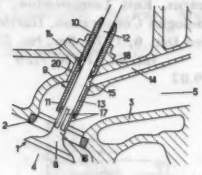
**3,977,188**

## FLUID INJECTING DEVICES IN AN INTERNAL COMBUSTION ENGINE

**Henri Arnaud, Cerny, France, assignor to Automobiles Peugeot, Paris and Regie Nationale des Usines Renault, Boulogne-Billancourt, both of, France**

**Filed Jan. 2, 1975, Ser. No. 538,297**
**Claims priority, application France, Jan. 7, 1974, 74.00480**
**Int. Cl.² F01N *3/10*; F02B *3/00***
**U.S. Cl. 60—304** **7 Claims**



1. A device for injecting gaseous fluid at the level of a valve of an internal combustion engine, said device being of the type including an injection conduit having an outlet discharging into the opening zone of the valve, the outlet being substantially closed by a portion of the valve adjacent the head thereof when the valve is in the closed position and open when the valve is in the opened position whereby fluid is injected into the opening zone of the valve only when the valve is in the open position, the improvement comprising, a valve guide having a body portion which is adapted to guide a conventionally constructed valve and an axially extending hollow skirt portion which is unitary with such body, the inner part of said hollow skirt being concentric with the valve stem and cooperating therewith to form the fluid injection conduit, the free end of said skirt portion terminating adjacent and being substantially closed by the enlarged portion of said valve in the area of the zone connecting the valve stem and valve head when said valve is in the closure position, and a traverse aperture formed in said valve guide to admit fluid under pressure

into said skirt, so as then to channel the fluid along the valve stem inside the conduit formed by the skirt and then inject the fluid when the valve is in the open position.

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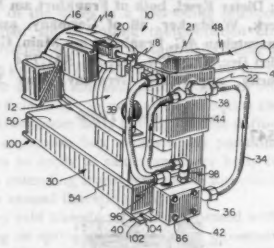
**3,977,189**

## RESERVOIR HOUSING

**Philip A. Kubik, 6809 Spruce Drive, Birmingham, Mich. 48010**

**Filed July 2, 1975, Ser. No. 592,414**
**Int. Cl.² F15B *21/04***
**U.S. Cl. 60—453** **6 Claims**



1. A hydrostatic drive unit of the type adapted to be connected in a closed-loop fashion to a fluid motor, said drive comprising:

a reservoir housing having an upper support surface;

a pump;

conduit means for connecting said pump to said motor in a closed-loop fashion;

fastening means for attaching said pump to said upper surface such that said housing supports said pump;

said reservoir housing having an enclosed chamber beneath said support surface, said chamber defining a reservoir for storing fluid at a low pressure;

means for communicating the fluid in said chamber to said closed-loop conduit means; and

a high-pressure filter for filtering fluid in said closed-loop conduit means as said fluid is returned to the inlet of said pump, said reservoir housing having a second chamber beneath said housing support surface and separate from said first chamber for storing said high-pressure filter.

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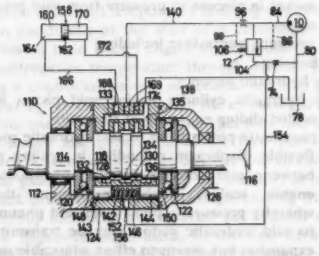
**3,977,190**

## PUMP SPEED DETECTING DEVICE

**Masahiro Kito, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed May 7, 1975, Ser. No. 575,246**
**Claims priority, application Japan, May 7, 1974, 49-49685**
**Int. Cl.² F15B *15/18***
**U.S. Cl. 60—459** **9 Claims**



1. A pump speed detecting device comprising:

a pump, driven by a means of variable speed prime mover, for discharging fluid from a reservoir, at a flow rate proportional to the number of revolutions thereof, to a fluid motor fluidically connected to said pump by means of a first conduit;

flow control valve means for diverting fluid from said first conduit;

first means for controlling said flow control valve means in response to the fluid flow from said pump to said fluid motor;

second conduit means for returning said diverted fluid to said reservoir or the suction side of said pump; and,

second means for controlling an actuating means responsive to said fluid flow within said second conduit means.

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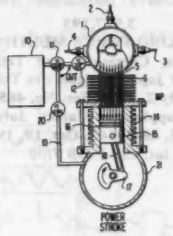
**3,977,191**

## ATOMIC EXPANSION REFLEX OPTICS POWER OPTICS POWER SOURCE (AEROPS) ENGINE

**Robert Gordon Britt, 313 W. Fisher St., Salisbury, N.C. 28144**

**Filed Aug. 14, 1974, Ser. No. 497,335**
**Int. Cl.² F01K *25/06***
**U.S. Cl. 60—509** **12 Claims**




1. An atomic expansion reflex optics power source comprising:

a plurality of pressure chambers, each having a reflecting mirror surface on its inside wall, and each having heat transfer fins and tubes as an integral part thereof, said plurality of pressure chambers having a plurality of electrodes extending into the inside of said pressure chambers, said electrodes being connected to a source of electrical voltage pulses, said pressure chambers being charged with a noble gas mixture under pressure, and

means to generate heat, pressure and power in said noble gas mixture within said plurality of pressure chambers.

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**3,977,192**

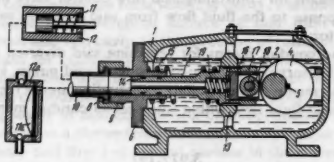
## HYDRAULIC DRIVE PULSATOR OF RECIPROCATING ACTION

**Igor Nikolaevich Smirnov, ulitsa Narodnogo opolchenia, 10, kv. 363; Mikhail Ivanovich Semenov, Pokrovsky bulvar, 8, kv. 13, both of Moscow; Nikolai Vasilievich Zjuzenko, ulitsa Merkelya, 17, kv. 2, Riga, and Vitaly Andreevich Sergeev, Konkovo-Derevlevo, Mikroraion 6, dom 26, korpus V, kv. 281, Moscow, all of U.S.S.R.**

**Filed Oct. 18, 1972, Ser. No. 298,630**
**Int. Cl.² F15B *7/02***
**U.S. Cl. 60—543** **4 Claims**

1. A hydraulic drive pulsator with actuating mechanism and reciprocating action, comprising: a housing with a cavity filled with liquid, a cylinder adjacent to the said housing; a cavity in the said cylinder communicating with the cavity of the said housing; a spring-loaded piston located in the cavity of the said cylinder and separating said cylinder from the space of said housing; a driving shaft of the said pulsator located in the cavity of the said housing; an eccentric fastened to the said driving shaft, said piston being set in reciprocating motion by the said eccentric; an axial hole bored in the said spring-loaded piston; a third chamber of said actuating mechanism with a device for compensating for the leakage of the liquid

therefrom and for protecting said third chamber against overload pressure, said device comprising: a spring-loaded valve built into said hole of said piston so that during the operating stroke of the said piston said valve is brought into contact with



said piston, said device while compensating for the leakage of liquid from the said third chamber or increasing the pressure therein, forming with said piston a clearance for the liquid to pass, the effective area of the said piston being smaller than the area confined by the line of its contact with said valve.

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**3,977,193**

## HYDRAULIC BRAKING FORCE MULTIPLYING DEVICE

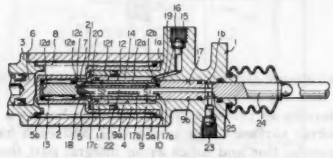
**Yoshihiro Hayashida, Chigasaki, and Tetsuo Haraikawa, Funabashi, both of Japan, assignors to Tokico Ltd., Japan**

**Filed July 2, 1974, Ser. No. 485,138**

**Claims priority, application Japan, July 11, 1973, 48-78642; Aug. 9, 1973, 48-89443; Oct. 19, 1973, 48-117607**

**Int. Cl.² F15B 7/00**

**U.S. Cl. 60—547** **5 Claims**



**1. A hydraulic braking force multiplying device for motor vehicles, comprising a body coupled to a master cylinder, a portion on said body which projects in the direction of said master cylinder, a cup-shaped power piston slidably mounted on said body coaxially with the master cylinder and engaged with the piston of said master cylinder, said cup-shaped piston when it moves toward said master cylinder defining therewithin and with said projecting portion a working chamber, said body having a pressure chamber therein having means for placing said pressure chamber in communication with a source of pressurized fluid, said body having a bore therein on the end remote from said projecting portion and opening into said pressure chamber, an input shaft slidable in said bore in the direction of movement of said cup-shaped power piston on said projecting portion, said input shaft having a drain bore therethrough in communication with a drain to a fluid reservoir, a valve stem member extending through said projecting portion from said cup-shaped power piston and through said pressure chamber to adjacent the end of said input shaft and being movable into and out of said working chamber, spring means engaging said valve stem member and urging it in a direction of the working chamber toward said input shaft, said valve stem member having a bore therein opening into said working chamber, a first valve seat means in said body and with which said valve stem member is engageable to form a first valve for placing said working chamber and said pressure chamber in communication when said first valve is open, the end of said input shaft toward said pressure chamber and a portion of said valve stem member facing toward said input shaft having valve member means and a second valve seat means thereon cooperating to form a second valve for placing said working chamber and said drain bore in communication when said second valve is open, one of said second valve seat means and said valve member means being resilient for causing both said first and second valves to be closed during the first part of the stroke of said input shaft toward said valve stem member, whereby when there is no pressure in said pressure chamber, the power piston will be moved directly by the movement of the input shaft engaging the valve stem member which in turn engages the cup-shaped power piston.**

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**3,977,194**

## DEVICE FOR FINE ADJUSTMENT OF THE TOOL SEAT OF A MACHINE TOOL

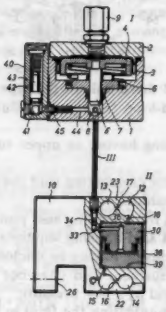
**Gerhard Klee; Dieter Eysel, both of Frankfurt am Main, and Wilfried Gerk, Waldacker, all of Germany, assignors to Samson Apparatebau AG, Frankfurt am Main, Germany**

**Filed Dec. 11, 1974, Ser. No. 531,774**

**Claims priority, application Germany, May 31, 1974, 2426409**

**Int. Cl.² B60T 13/00**

**U.S. Cl. 60—547** **2 Claims**



**1. A device for fine adjustment of a tool seat of a machine tool, comprising in combination:**

**a pneumatic-hydraulic pressure transmitter,**

**a pressure transducer formed as a cuboid and adapted to act as a positioning member for said tool seat;**

**said pressure transmitter and said pressure transducer formed as separate bodies;**

**flexible coupling means connecting said pressure transducer to said pressure transmitter to receive pressure therefrom and to enable relative movement therebetween;**

**said pressure transducer including**

**means defining a tool seat on said pressure transducer,**

**expansion box means within said pressure transducer, and**

**means adapted to effect adjustable positioning of said tool seat as a result of action of said expansion box means in resonse to pressure from said pressure transmitter;**

**said pressure transmitter including**

**a housing,**

**an hydraulic piston,**

**an hydraulic cylinder having said piston mounted in sealed sliding engagement therewith,**

**a pneumatic piston fixed to said hydraulic piston,**

**a flexible diaphragm extending in sealing engagement between said housing and said pneumatic piston to enable sealed slidable movement therebetween whereby pressure applied from said pneumatic piston to said hydraulic piston may be transmitted to said expansion box means to effect adjustable movement of said tool seat,**

**a reservoir of hydraulic pressure fluid,**

**check valve means interposed between said reservoir and said hydraulic cylinder, and**

a spring loaded piston biased to introduce said fluid into said cylinder through said check valve means,

said check valve means operating to permit hydraulic fluid flow to said cylinder when the pressure therein drops below a predetermined level thereby to replenish leakage of fluid therefrom;

said pressure transducer being configured as a three dimensional body having holes formed therein to enable expansion and contraction of said body, said holes being disposed in pairs located on opposite sides of said transducer body and extending therethrough in directions parallel to said tool seat, with each of said pairs of holes being juxtaposed with one hole closer to said tool seat than the other each of the holes of a pair being interconnected by an intrapair slit extending therebetween connecting their superficies, with each of said pairs being interconnected by an interpair slit extending between the hole of one pair closer to said tool seat and the hole of another pair furthest from said tool seat and connecting their superficies; said transducer body having a recess defined therein with said expansion box means being positioned within said recess to apply to said transducer body forces in directions extending transverse to the direction in which said holes extend therethrough;

whereby said transducer body is formed with flexible webs acting as spring means enabling movement of said tool seat while maintaining said tool seat parallel to itself.

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**3,977,195**

## METHOD FOR CONDITIONING THE INTAKE AIR OF A SUPERCHARGED, LOW-COMPRESSION RATIO DIESEL ENGINE

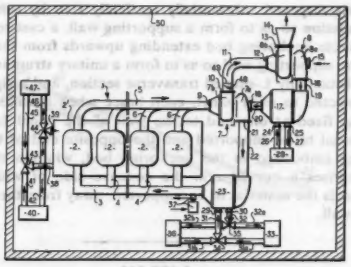
**Bernard Treuil, Paris, France, assignor to Societe d'Etudes de Machines Thermiques, Saint-Denis, France**

**Filed June 28, 1974, Ser. No. 484,212**

**Claims priority, application France, Oct. 16, 1973, 73.36900; Dec. 28, 1973, 73.46749**

**Int. Cl.² F02D *23/00***

**U.S. Cl. 60—602** **9 Claims**



**1.** A method of at least temporarily assisting and promoting the ignition conditions at the start of a cold supercharged low-compression ratio Diesel engine in particular by raising the final compression temperature through at least partially withholding a controlled amount of residual working gases in each cylinder by selectively impeding the exhaust gas streaming therefrom and reducing the exhaust gas flow rate through artificial pressure loss generation in the flow path of said exhaust gases between each engine cylinder and an exit where said exhaust gases are discharged to the outside, in order to raise the back-pressure on said exhaust gas coming from said cylinder thereby increasing the residual gas content therein, wherein the improvement consists, in the case of a highly supercharged Diesel engine, in the steps of : initially cranking said engine from the stopped condition while temporarily preventing any fuel injection into its cylinders and at the same time restraining and hindering said exhaust flow therefrom so as to drive said engine for several operating cycles without any ignition and combustion therein and with each cylinder being only filled and working with pure precompressed air drawn therein and exhausted therefrom so that said cylinders be incompletely emptied annd scavenged, thereby causing air to at least partially remain and be retained and heated up through further compression within each cylinder and thus to supply and give off heat to the incoming fresh air charge sucked in; then after said engine has thus been warmed up to some extent, allowing fuel to be injected into each cylinder at the end of each compression stroke and to be burnt therein; and restoring free unimpeded exhaust gas flow conditions as soon as the engine has started and begun to run by itself.

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**3,977,196**

## METHOD AND APPARATUS FOR CONDENSING BY AMBIENT AIR FOR A FLUID IN A THERMAL POWER PRODUCTION PLANT

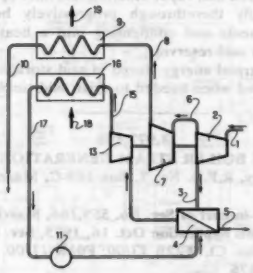
**Marcel Sédille, Paris, France, assignor to Societe des Condenseurs Delas, Paris, France**

**Filed Aug. 13, 1975, Ser. No. 604,372**

**Claims priority, application France, Aug. 26, 1974, 74.29100**

**Int. Cl.² F01K *23/02***

**U.S. Cl. 60—655** **7 Claims**



**1.** In a method of condensation of the working fluid of a thermal power production plant by ambient air, the improvement comprising the steps of indirectly exchanging heat between the ambient air in a first zone and a fluid having a freezing point lower than the minimum temperature which can be reached by the ambient air, and a second step of indirectly exchanging of heat between the ambient air and a second zone downstream of the first zone of heat exchange with said ambient air with the indirect exchange of heat and the flow of the fluid having a low freezing point in said first zone being such that the ambient air leaves the first zone of indirect heat exchange at a temperature higher than the freezing point of the working fluid in the thermal power production plant.

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**3,977,197**

## THERMAL ENERGY STORAGE SYSTEM

**Lott W. Brantley, Jr., Union Grove, Ala., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.**

**Filed Aug. 7, 1975, Ser. No. 602,618**

**Int. Cl.² F01K *3/00***

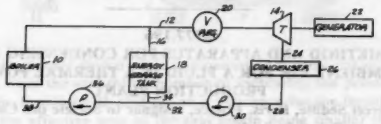
**U.S. Cl. 60—659** **8 Claims**

**1.** An energy storage device for use in an energy storage and conversion system having a boiler for heating a fluid flowing therethrough converting the fluid into a superheated vapor, conduit means for delivering the vapor to a turbine for driving the turbine, a generator driven by said turbine for generating electricity, a by-pass conduit for delivering part of the vapor to and from said energy storage device, regulator means for regulating the pressure of the vapor delivered to the turbine

while regulating the delivery of vapor to and from said energy storage device, condensor means for converting the vapor exiting the turbine into a cooled fluid, and pump means for returning said cooled fluid to said boiler while delivering part of the fluid to the energy storage device, said energy storage device comprising:

a. a vertical storage tank having an inlet opening formed in a top thereof connected to said conduit means;

b. a plurality of stacked vertical compartments formed within said tank so as to be interconnected with each other;




c. a reservoir formed within said storage tank beneath said stacked compartments for storing fluid condensing from said vapor;

d. said stacked compartments and said reservoir being interconnected so that vapor entering said inlet opening passes downwardly therethrough progressively heating said compartments and condensing into a heated fluid for storage in said reservoir;

whereby thermal energy stored in said storage device may be removed when needed to drive said turbine.

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**3,977,198**

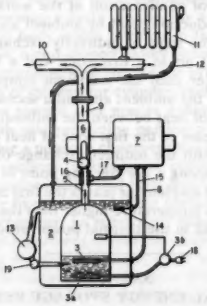
## MULTIPLE BOILER STEAM GENERATION SYSTEM

**Clyde F. Berry, R.F.D. No. 7, Box 169-C, Manchester, N.H. 03104**

**Continuation-in-part of Ser. No. 559,164, March 17, 1975, abandoned. This application Oct. 16, 1975, Ser. No. 622,812**

**Int. Cl.² F22B** *33/00*; **F01K** *11/00*

**U.S. Cl. 60—676** **9 Claims**



1. In combination, a first boiler within a second larger boiler,

a first electrically actuated heating element in heat transfer engagement with the water in said first boiler,

an outside source of heat for the water in said first boiler,

a turbine adapted to be driven by steam from said first boiler,

an electric generator driven by said turbine,

said generator operatively connected to said first heating element whereby when said generator is being driven by said turbine said generator will supply current to said first heating element to provide some of the heat which together with the outside heat source will form steam in said first boiler faster than steam is being used to drive said turbine,

means for controlling the flow of steam to said turbine,

an exhaust steam pipe from said turbine leading to a closed system steam consuming device,

means for returning the condensate from said device to said second boiler,

and a second electrically actuated heating element in said second boiler capable of maintaining the water temperature therein at a predetermined degree.

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**3,977,199**

## SHORING STRUCTURE FOR EMBANKMENTS

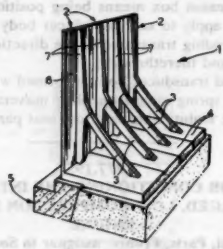
**Carlo Chiaves, Piazza Adriano 6, Turin, Italy**

**Filed June 26, 1975, Ser. No. 590,733**

**Claims priority, application Italy, July 1, 1974, 69078/74**

**Int. Cl.² E02D** *5/20*

**U.S. Cl. 61—39** **4 Claims**



1. An embankment shoring structure comprising a cast foundation, a number of prefabricated reinforced concrete panels disposed substantially vertically side by side on the foundation so as to form a supporting wall, a cast reinforced concrete anchoring bed extending upwards from the bottom of the supporting wall so as to form a unitary structure having a substantially L-shaped transverse section, and a rigid brace connected to each panel, each brace when installed on site being fixed at one end to the wall of the panel facing the material to be supported and the opposite end of the brace being embedded in the anchoring bed, wherein the brace comprises a curved arm the concave side of which faces towards the material to be supported, away from the supporting wall.

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**3,977,200**

## LIGHTHOUSE OR BEACON CONSTRUCTION

**Mauri Määttänen, Oulu, Finland, assignor to Oy Yleinen Insinooritoimisto, Helsinki, Finland**

**Filed Feb. 20, 1975, Ser. No. 551,286**

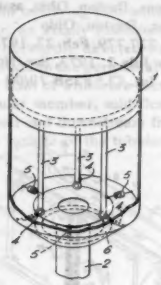
**Claims priority, application Finland, Feb. 25, 1974, 542/74**

**Int. Cl.² E02D** *21/00*

**U.S. Cl. 61—86** **14 Claims**

1. A lighthouse or beacon construction comprising an upper part adapted to house light sources, crew rooms and the like, a lower part adapted to be driven into a sea bottom to fasten said construction to the sea bottom, said lower part including a single rigid frame member extending upwardly above the water line to support said upper part, connection members for connecting said upper part to said single member of said lower part in a non-rigid connection to permit said lower part to move substantially horizontally in relation to said upper part, said connecting means maintaining said upper part in a substantially vertical position when said lower part moves horizontally, said connecting means including spring means for

centering said upper part in relation to said single member of said lower part, and restriction means coacting between said



upper and lower parts for restricting horizontal movement of said upper part.

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**3,977,201**

**METHOD AND APPARATUS FOR PREVENTING BUCKLING OF PIPELINE AS IT IS BEING ASSEMBLED AND LAID ON THE OCEAN FLOOR**

**Robert B. Bittner, 4341 SW. Woodside, Lake Oswego, Oreg. 97034**

**Filed Mar. 19, 1975, Ser. No. 559,900**
**Int. Cl.² F16L 1/00**
**U.S. Cl. 61—112** **9 Claims**

1. A process for laying an elongated thin walled large diameter pipeline on the ocean floor, comprising the steps of:

assembling the pipeline adjacent the ocean surface;

lowering a segment of the pipeline from the ocean surface to the ocean floor to place a portion of the segment of the pipeline supported on the ocean floor with an unsupported portion of the segment extending upward from the ocean floor;

filling at least a portion of the segment portion supported on the ocean floor with sufficient liquid to provide a gastight liquid seal within the pipeline and to minimize lateral movement of the pipeline due to ocean currents;

pressurizing the interior of the unsupported portion of the segment of the pipeline with a gas to produce a longitudinal tension along the unsupported portion of sufficient magnitude to prevent buckling of the unsupported portion as it is being lowered to the ocean floor; and

progressively lowering the pressurized unsupported segment to the ocean floor.

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**3,977,202**

**COLD PACK DEVICE**

**Samuel Laurence Forusz, Trenton; William Frank Vinczi, Edison, and Milton Ralph Cross, Freehold, all of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.**

**Filed May 28, 1975, Ser. No. 581,452**
**Int. Cl.² F25D 5/00**
**U.S. Cl. 62—4** **8 Claims**

1. A method of applying cold to a part of the body comprising applying a fast activation, long duration, reusable cold pack device comprising ammonium nitrate, sodium acetate trihydrate and an aqueous solution of ethylene glycol wherein said components are separated until activation is desired but when activated by admixing, an endothermic reaction occurs resulting in a lowering of the temperature of the device.

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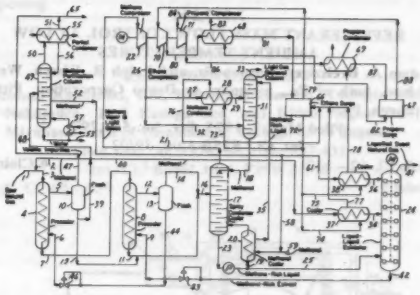
**3,977,203**

**PURIFICATION OF NATURAL GAS BY LIQUID/LIQUID EXTRACTION WITH A POLAR SOLVENT**

**Robert A. Hinton, Mount Vernon, Ind., and Fred Kurata, Lawrence, Kans., assignors to Kansas University Endowment Association, Lawrence, Kans., by said Fred Kurata**

**Filed Mar. 25, 1974, Ser. No. 454,740**
**Int. Cl.² F25J 3/02**
**U.S. Cl. 62—17** **11 Claims**



1. In a process for the purification of a gaseous stream comprising chiefly methane and small amounts of carbon dioxide, hydrogen sulfide, and water vapor as undesirable constituents wherein said gaseous stream is mixed with a liquid, inert polar organic compound, and cooled, the improvement comprising liquefying condensible components in the resulting mixture by subjecting the same to a temperature of −110°F to −170°F and a pressure of 650 to 300 psia to form a liquid mixture of two immiscible liquid phases, the lighter phase comprising a methane-rich phase and the havier phase comprising a phase rich in said polar organic compound, and extracting the resulting liquefied product with said liquid polar organic compound in a liquid-liquid extraction zone to separate and recover a purified, liquefied stream of methane.

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**3,977,204**

**ALCOHOL CIRCULATION SYSTEM**

**Joseph R. Bourne, Dewitt, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

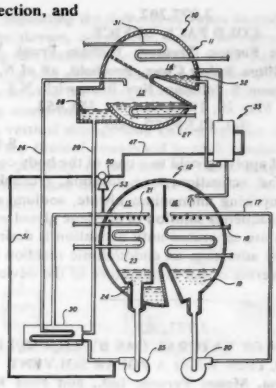
**Filed Nov. 14, 1975, Ser. No. 631,982**
**Int. Cl.² F25B 47/00, 15/00**
**U.S. Cl. 62—85** **17 Claims**

1. The method of circulating alcohol within an absorption refrigeration system having a condenser section, an evaporator section, and an absorber section, including the steps of

separating alcohol from refrigerant discharged from the condenser section,

delivering the separated refrigerant into the evaporator

section, and



delivering the separated alcohol into the absorber section whereby the flow of alcohol passing through the system bypasses the evaporator section.

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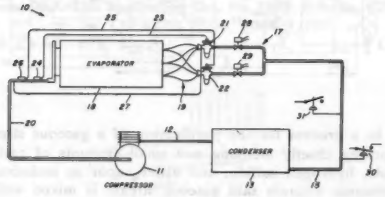
**3,977,205**

## REFRIGERANT MASS FLOW CONTROL AT LOW AMBIENT TEMPERATURES

**Adam A. Dreisziger, Coraopolis, and Ralph R. Kirsch, Wexford, both of Pa., assignors to Dravo Corporation, Pittsburgh, Pa.**

**Filed Mar. 7, 1975, Ser. No. 556,297**
**Int. Cl.² F25B** *5/00, 39/02*
**U.S. Cl. 62—117** **6 Claims**




**1.** In a refrigeration system comprising a compressor, an air-cooled condenser and an evaporator, all of which are connected in series, including improved means for maintaining an adequate mass flow of refrigerant to the evaporator at below normal high-side pressure, the improvement comprising two parallel refrigerant distributor means located between the condenser and the evaporator, first means associated with the distributor means causing refrigerant to be fed to the evaporator through one of said distributor means when the high-side pressure is at or above a predetermined level and second means associated with the distributor means causing refrigerant to be fed through both of said distributor means when the high-side pressure is below the predetermined level.

**6.** In a refrigeration process comprising the steps of evaporating a refrigerant in an evaporator, compressing the refrigerant vapor in a compressor and condensing the refrigerant in an air-cooled compressor, an improved method of maintaining adequate mass flow of refrigerant to the evaporator at below normal high-side pressure comprising the steps of sensing the high-side pressure via pressure sensing means, metering refrigerant to the evaporator through one of two distributor means when the high-side pressure is at or above a predetermined level and metering refrigerant to the evaporator through both distributor means when the high-side pressure is below the predetermined level.

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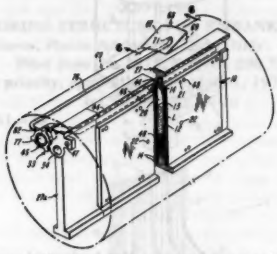
**3,977,206**

## HEAT TRANSFER SYSTEM

**Carl Edward Simmons, Dayton, Ohio, assignor to United Aircraft Products, Inc., Dayton, Ohio**

**Division of Ser. No. 227,779, Feb. 22, 1972, abandoned. This application July 2, 1973, Ser. No. 375,922**
**Int. Cl.² F25B** *19/00*
**U.S. Cl. 62—170** **3 Claims**



**1.** A heat transfer system, including means forming a liquid reservoir, means for flowing a heated fluid through said reservoir under conditions promoting a rejection of heat from said fluid to the liquid in said reservoir, a valve accommodating chamber having an inlet receiving vapor from said reservoir and a continuously open outlet, absolute pressure relief valve means controlling venting of said reservoir, said valve means including a valve element adapted to seat in said chamber in a closing relation to said vapor inlet, an evacuated bellows reflecting a substantially zero p.s.i.a. reference pressure and with respect to which said valve element is in end mounted relation, and a spring urging expansion of the bellows to seat said valve element in an inlet closing position, said spring being selected for an ability to maintain said valve element closed under low vapor pressures in said reservoir and to allow unseating or opening of said valve element in the presence of an absolute pressure as determined by the desired interior pressure of the liquid reservoir, said valve element reclosing when interior pressures drop below said desired pressure, and means establishing subambient environmental pressures in said valve accommodating chamber about said bellows in both an open and a closed position of said valve element.

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**3,977,207**

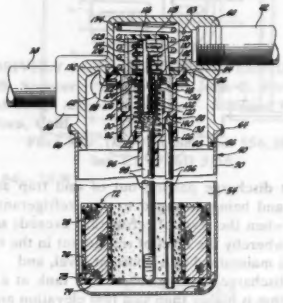
## FREEZE THROTTLING VALVE

**Carl A. Scherer, Clarence Center, and Hugh J. Muirhead, Lockport, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.**

**Filed June 23, 1975, Ser. No. 589,472**
**Int. Cl.² F25D** *21/00;* **F25B** *41/04*
**U.S. Cl. 62—217** **2 Claims**

**1.** In an air conditioning system including a compressor for pumping and pressurizing refrigerant, a condensor for cooling and liquifying refrigerant, an expander to reduce refrigerant pressure, an evaporator for cooling air by transmitting heat to liquid refrigerant therein and thereby causing vaporization of refrigerant and refrigerant storage means which also separates refrigerant into liquid and vaporous phases, an improved evaporator temperature control comprising: an elongated valve structure including a housing which is axially extendable and contractable; said housing including an elongated, relatively narrow tubular member having a side wall and a closed end defining an interior filled with water and which side wall is sufficiently rigid to withstand the pressure force produced by ice formation therein to direct pressure forces in an axial

direction toward a second end; an outwardly extending annular edge portion on the second end of said tubular member, one surface of which forms a valving surface adapted to engage a valve seat to control fluid flow; a resilient diaphragm member extending across said second end and having a peripheral edge portion overlying said annular edge portion of the tubular member; an axially extendable and contractable member having an outwardly directed flange portion at one end in overlying relation to the peripheral edge portion of said diaphragm member both of which are secured to said annular portion of said tubular member; said flexible member being supported at a second end downstream from said evaporator to locate said valve surface of the tubular member in spaced



relation with respect to the valve seat whereby extensions and contractions of the flexible member cause said valve surface to move relative to the valve seat and thereby control refrigerant flow; said diaphragm member having a generally tubular shaped, deep pocket at its mid-portion extending in an axial direction into the interior of said tubular member so that one side is exposed to water therein; a push rod with one end portion extending into said diaphragm pocket and with the other end attached to said flexible member so as to transform the compressive forces on the push rod produced by ice formation within the tubular member into movement of the tubular portion and flexible member thereby causing the valve surface thereon to move in an axial direction.

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**3,977,208**

**CONTAINERS FOR PERISHABLE CARGOES**

**Arthur Victor Heighton, Ongar, England, assignor to Overseas Containers Limited, London, England**

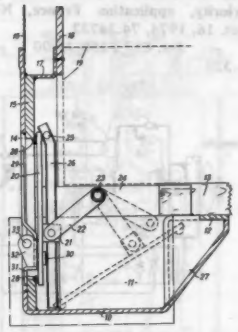
**Filed Dec. 10, 1974, Ser. No. 531,358**

**Claims priority, application United Kingdom, Dec. 10, 1973, 57040/73**

**Int. Cl.² F25D** *15/00*; **B63B** *25/26*; **F25D** *17/06*; **F24F** *13/00*

**U.S. Cl. 62—237** **3 Claims**

**3.** A container having at its base a plenum chamber extending across the width of the container, an inlet opening for the supply of cold air from the exterior of said container, said plenum chamber connecting said inlet opening with the interior of the container, a closure member for the inlet opening, said closure member comprising a cover mounted within the container to be applied against the inlet opening, and a latch member mounted on said cover to be accessible from the



exterior of the container when the cover is applied to the inlet opening.

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**3,977,209**

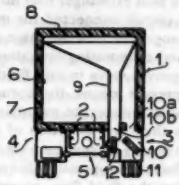
**REFRIGERATOR CAR**

**Susumu Kanashiki, 170, Fudokoro, Tanuma, Tochigi; Seishi Nakamura, 11-3 Kasuga cho, and Hideo Nagai, 3-4-11 Miyahara, both of Utsunomiya, Tochigi, all of Japan**

**Filed Dec. 30, 1974, Ser. No. 537,431**

**Int. Cl.² B60H** *3/04*; **F25B** *27/00*

**U.S. Cl. 62—239** **7 Claims**




**1.** In a refrigerator car having a chassis, the combination comprising

a freezing container mounted on said chassis and having a floor, a ceiling and a cooling duct opening near said ceiling thereof;

a refrigeration unit mounted on said chassis under said floor of said freezing container, said refrigeration unit including a cooling air conduit having an inlet communicating with said freezing container and an outlet communicating with said cooling duct;

a power unit mounted on said chassis under said floor of said freezing container and transversely spaced from said refrigeration unit; and

means for transmitting power from said power unit to said refrigeration unit,

said freezing container includes a heat-insulator wall formed with a bore,

parallel arranged joint ducts disposed in said bore, and

one of said joint ducts communicates said cooling duct with the outlet of said cooling air conduit and another of said joint ducts communicates said freezing container with said inlet of said cooling air conduit.

## 3,977,210
## HEAT EXCHANGER APPLICABLE MORE PARTICULARLY TO COMPRESSOR HEAT PUMPS

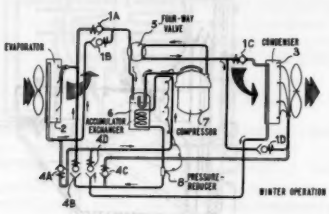
**Jacques Bruguier, Talant, France, assignor to Societe Anonyme dite: Frimair S.A., France**

**Filed Nov. 12, 1974, Ser. No. 523,122**

**Claims priority, application France, Nov. 16, 1973, 73.40819; Oct. 16, 1974, 74.34732**

**Int. Cl.² F25B *13/00***

**U.S. Cl. 62—324** **3 Claims**




1. A heat exchanger system operating with a fluid having both a liquid and gaseous phase, including:

a fluid circuit for a fluid having a liquid phase when compressed and cooled and a gaseous phase when heated and at a reduced pressure,

a pair of heat exchangers in said fluid circuit, both of which can operate alternatively as a condenser and an evaporator,

compressor means connected in said fluid circuit to said heat exchangers for compressing said fluid when in a gaseous phase,

an accumulator-exchanger connected in said fluid circuit to said compressor means and a pressure reducer connected with the accumulator exchanger,

for each heat exchanger four non-return valve means in said fluid circuit connected for maintaining inside each said exchanger the flow direction of the fluid during condensing and evaporating operation thereof,

a changeover valve in said fluid circuit associated with the compressor means, the accumulator exchanger and the pressure reducer, to maintain inside these three components the same direction of fluid flow, said changeover valve having means operable to a first position controlling the fluid under pressure for setting the non-return valves so that the fluid flow causes a first heat exchanger to operate as an evaporator, and a second heat exchanger to operate as a condenser, thereby heating incoming air to the system, the last-mentioned means being operable to a second position controlling the fluid under pressure for setting the non-return valves so that the first heat exchanger operates as a condenser, and the second heat exchanger operates as an evaporator, thereby cooling incoming air to the system.

## 3,977,211
## ALCOHOL SEPARATOR

**Joseph R. Bourne, Dewitt, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

**Filed Nov. 14, 1975, Ser. No. 631,983**

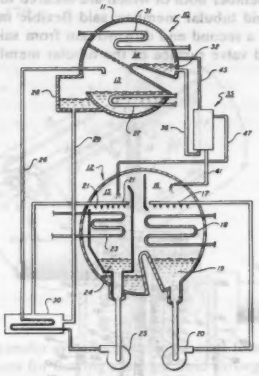
**Int. Cl.² F25B *15/00***

**U.S. Cl. 62—476** **7 Claims**

1. Apparatus for separating alcohol from a denser refrigerant discharged from the condenser section of an absorption refrigeration system including

a tank operatively connected to the condenser section of the system to receive therein a flow of condensed refrigerant and alcohol leaving the condenser, the volume of the tank being sufficiently large in relation to volume rate of flow of the entering condensate to produce a quiescent flow of fluids within the tank whereby the less dense alcohol floats to the surface of the more dense refrigerant collected therein,

a substantially enclosed trap secured in fluidtight relation with the bottom wall of said tank and extending upwardly within said tank in a generally vertical direction, the trap having an opening in one side wall thereof adjacent to the bottom wall of said tank whereby refrigerant contained within the tank passes freely into said trap,



a refrigerant discharge passing out of said trap at a first elevation and being arranged to pass refrigerant out of said tank when the level of refrigerant exceeds said first elevation whereby the level of refrigerant in the trap and the tank is maintained at a constant level, and

an alcohol discharge passing out of said tank at a second elevation that is higher than said first elevation and being arranged to carry alcohol floating upon the surface of the refrigerant out of said tank when the level of alcohol exceeds said second elevation thereby causing the alcohol to be separated from the refrigerant.

## 3,977,212
## FLEXIBLE COUPLING

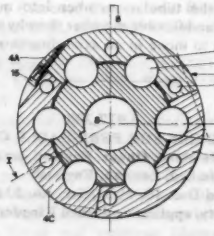
**Carl-Eric Johansson, Blaricum, Netherlands, assignor to SKF Industrial Trading and Development Company, B.V., Jutphaas, Netherlands**

**Filed May 18, 1974, Ser. No. 469,694**

**Claims priority, application Netherlands, May 14, 1973, 7306658**

**Int. Cl.² F16D *3/64***

**U.S. Cl. 64—14** **8 Claims**




1. A flexible coupling assembly comprising first and second members, one being a driving member and the other being a driven member, said first member having a first, outer circumferential circular surface, said second member including a coupling part thereof which has a second, inner circular cir-

cumferential surface adjacent and radially outward of said first surface, each of said surfaces including a plurality of spaced-apart generally hemispherical cavities, said cavities in one of said surfaces being adjacent and corresponding to the cavities in the other surfaces and together defining a plurality of generally spherical pockets, a plurality of deformable, resilient spherical rolling elements each having a diameter corresponding to said pockets, each one of said elements situated in each of said pockets, said pockets defining in radial cross-section view centrally through said pockets, circles of diameter D, and in axial cross-sectional view, ovals of dimension D in radial direction and a dimension greater than D in the axial direction, said coupling part being a first ring comprising separable segments which are removable from said second member in a generally radial direction, independent of and without disassembling said first and second members, said rolling elements being similarly movable after said segments are removed, first means for detachably securing said segments to form said first ring, and second means for urging said first ring axially for pre-loading said rolling elements in said pockets.

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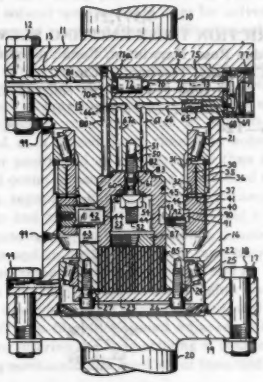
**3,977,213**

## EXPLOSIVELY ACTUATED OVERSPEED DECOUPLER

**Donald B. Spencer, Portland, and John E. Ferguson, Aloha, both of Oreg., assignors to Guy F. Atkinson Company, San Francisco, Calif.**

**Filed Mar. 7, 1975, Ser. No. 556,209**
**Int. Cl.² F16D** *3/56*
**U.S. Cl. 64—28 R** **17 Claims**



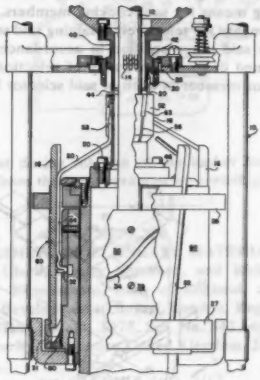
**1.** A decoupler comprising a rotary driving member and a coaxial rotary driven member, a driving ring connected with said driving member, a driven ring concentric with said driving ring connected with said driven member, axial teeth on said rings projecting in the same axial direction, a coupler ring coaxial with said driving and driven rings and having axial teeth projecting in an opposite axial direction in confronting relation to the teeth on said driving and driven rings, means holding said coupler ring teeth in engagement with said driving and driven ring teeth causing said driven member to be driven by said driving member, and axial means for shifting said coupler ring axially away from said driving and driven rings to decouple said members.

**3,977,214**

## ANGULARLY OFFSET NEEDLE KNITTING MACHINE

**John Greczin, 7312 School Lane, Philadelphia, Pa. 19126**

**Filed Apr. 29, 1975, Ser. No. 572,737**
**Int. Cl.² D04B** *15/10*
**U.S. Cl. 66—9 A** **14 Claims**



**1.** In a circular knitting machine having a rotational axis, the combination of

A. a needle cylinder means to guide a plurality of knitting needles,

1. said needle cylinder means being provided with a plurality of lower knitting needle receiving grooves, the grooves defining two side walls and a bottom,
2. said lower grooves being angularly inclined relative to the axis,
3. any two points on a groove bottom being equidistant from the axis;
4. the walls of the groove being generally parallel to a radial line drawn from said axis

B. a plurality of knitting needles having first portions thereof positioned within the lower grooves,

1. said knitting needles being movable within the said lower grooves in an inclined orientation which is offset from the axis; and

C. cam track means receiving a second portion of the knitting needles therein and being rotated relative to the needle cylinder means to move the knitting needles within the lower grooves.

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**3,977,215**

## NEEDLE SELECTOR MECHANISM FOR KNITTING MACHINE

**Juan-Ramon Moreu Orobitg, Premia De Mar, Spain, assignor to Jumberca, S.A., Badalona, Spain**

**Filed July 11, 1975, Ser. No. 595,013**
**Int. Cl.² D04B** *15/78*
**U.S. Cl. 66—50 R** **3 Claims**

**1.** A knitting machine having

a frame,

a needle bed rotatably moveable with respect to the frame,

a plurality of needles mounted in said needle bed and capable of occupying at least an operative position and an inoperative position,

a driving device for said needle bed,

means for moving said needles from one to the other of said positions and vice versa,

a selector means for the positioning of said needle moving means comprising at least

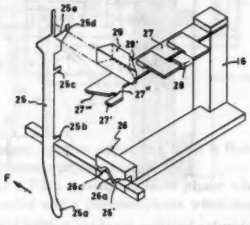
one selector member attached to said frame and capable of occupying an operative position, in which it engages said needle moving means and an inoperative position

in which it is disassociated from said needle moving means,

resilient recovery means tending constantly to bias said selector member to one of said positions,

cocking members for moving said selector member from said one position to the other of said positions against the force of said resilient recovery means, and

actuating means for said cocking members, electromagnetic means for selectively retaining said selector member in said other position in accordance with a programmed control, a plurality of selection levels, said selector member at each of said selector levels having



a first cocking member engaging portion and a second, selector cam shaped portion and wherein the cocking member actuating means comprises an actuating cam and a transmission jack housed in a vertical trick of the needle bed, said jack having a butt adapted for acting as a cocking member against said first portion of the selector member, so that in one stage, under the action of said actuating cam, the selector member is moved to said other position, and in a further stage, said second portion of said selector member pushes and refrains from pushing said transmission jack, as said electromagnetic retaining means release and retain said selector member in said other position, respectively.

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**3,977,216**

**KNITTING MACHINES AND METHODS FOR KNITTING FABRICS HAVING TERRY LOOPS ON BOTH SIDES THEREOF**

**Victor J. Lombardi, Burlington, N.C., and Jose Ma Dalmau, Barcelona, Spain, assignors to Jumberca, S.A., Barcelona, Spain, a part interest**

**Filed Apr. 21, 1975, Ser. No. 569,742**

**Int. Cl.² D04B 15/08**

**U.S. Cl. 66—111** **28 Claims**

1. An improved knitting mechanism for forming terry cloth fabric in which at least the technical front face of a knitted ground fabric is provided with upstanding front loops knit therein comprising:

a plurality of needles having latches pivotally attached thereto which move between open and closed positions;

sinker means for cooperating with said plurality of needles for forming knitted in loops on at least the technical front face of said base fabric;

means to feed a ground yarn and at least front loop yarn;

means for lifting the fabric to a level to allow a front loop yarn to be fed beneath the fabric;

means for arresting the pivotal movement of the latches thereby controlling the extent to which the latches can open so as to prevent the severing of loops forming said fabric while such loops are held on said plurality of needles below the latches; and

means for operating said needles and said sinker means.

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**3,977,217**

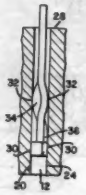
**FRICTION TWIST KNITTING ELEMENT**

**William Alden Ross, Harwinton, Conn., assignor to The Torrington Company, Torrington, Conn.**

**Filed June 1, 1971, Ser. No. 148,822**

**Int. Cl.² D04B 35/04**

**U.S. Cl. 66—124** **2 Claims**

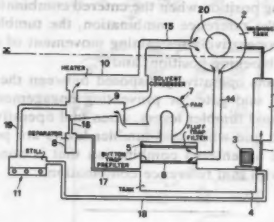


1. A needle for use in a slot having two side walls of a knitting machine cylinder comprising: an elongated body with a rectangular cross section, a butt at one end of the elongated body with a known cross section having a short axis and a long axis, a hook and latch at the other end of the elongated body, said elongated body having a plurality of twisted portions on its lower portion and extending along a minor portion of the longitudinal axis of the elongated body, the amount of the twists being such that the twisted portions will flexibly press against the walls of the slot with a certain frictional force and the butt will press up against at least one wall of the slot with a certain frictional force whereby as the needle is reciprocated the twisted portions and butt will flexibly press against the walls of the slot with a uniform frictional force and the hook and latch will stay in a plane which is generally parallel to the side walls along the center line of the slot.

## 3,977,218
## WASHING AND DRYING PLANT-DEVOID OF ANY ISOLATING VALVE

Guido Zucchini, Bologna, Italy, assignor to AMA Universal S.p.A., Bologna, Italy

Filed May 13, 1976, Ser. No. 576,953
Claims priority, application Italy, Dec. 6, 1974, 3549/74
Int. Cl.² D06F *43/08*
U.S. Cl. 68—18 R 4 Claims



1. An apparatus for cleaning and drying which is free of cut-off valves, the apparatus comprising, in combination:

a constant circulation solvent cleaning circuit free of cut-off valves and having a solvent tank for holding solvent, a pump for drawing and circulating solvent from said tank, a solvent filter for filtering solvent drawn by said pump, a wash tank having an inlet connected to said solvent filter and an outlet connected to said solvent tank, said wash tank being positioned at a level higher than both said solvent tank and said filter for solvent drawn by said pump, and a second filter for filtering solvent exiting from said wash tank; and

a garment drying and solvent recovering circuit free of cut-off valves and having a fan with an intake and an outlet, said intake being connected to said solvent tank above expected maximum level of solvent and being positioned at a higher level than said solvent tank, a condenser positioned at a higher level than said solvent tank, said outlet of said fan being connected to said condenser, a separator having an inlet connected to said condenser and an outlet connected to said solvent tank, an air heater having an intake which is connected to said condenser and an outlet, said wash tank having an additional inlet connected to said outlet of said air heater, said wash tank also being positioned at a higher level than said fan, said condenser, said separator and said air heater, and a fluff trap filter positioned adjacent said intake of said fan for filtering the fluid arriving at said fan, said fluff trap being positioned at a level lower than said wash tank.

## 3,977,219
## LINT FILTER FOR AUTOMATIC WASHER

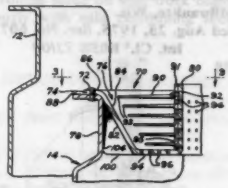
John Bochan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Sept. 15, 1975, Ser. No. 613,478
Int. Cl.² D06F *39/10*
U.S. Cl. 68—18 F 12 Claims

1. In a washing machine having a rotatable walled basket for receiving items to be washed and means for recirculating liquid therein, a lint filter comprising:

a. an annulus channel member having an inside wall, an outside wall, and perforations for liquid to pass therethrough; said annulus channel member being secured to the wall of the basket inwardly thereof; and

b. a plurality of elongated protuberances having bases and terminal ends, said protuberances being attached to the inside wall of the annulus channel member with their bases positioned toward the rotational axis of the basket

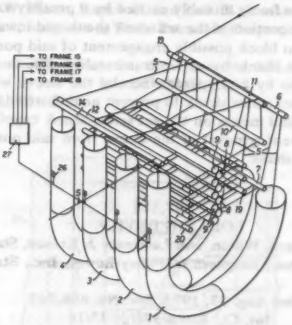


such that during rotation of the basket lint will be removed from the protuberances by centrifugal force.

## 3,977,220
## WASHING OF ELONGATE MATERIALS

Peter John Clark, Stoney Stratford, and Richard Sidney Shanahan, Birmingham, both of England, assignors to Strattwell Developments Limited, London, England

Filed Jan. 21, 1975, Ser. No. 542,869
Claims priority, application United Kingdom, Jan. 28, 1974, 3798/74
Int. Cl.² D06B *1/02, 3/12*
U.S. Cl. 68—22 R 3 Claims



1. Washing apparatus for elongate material in which the material is caused to pass lengthwise through the apparatus in a plurality of sequential passes, each pass including a washing section and a soaking section, each washing section comprising means to spray the material and a plurality of driving and driven rollers disposed to provide a serpentine path for the material said plurality of rollers comprising at least three rollers defining squeezing means for said material in each said washing section, each soaking section comprising an axially curved tube providing for storage and soaking of the of the material therein and also- has been inserted providing a return path for the material from the end of any one washing section to the beginning of the next in sequence,

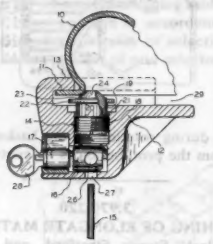
at least one of said three rollers being a driven roller which is resiliently engaged at spaced apart points by said other two rollers, means for effecting relative disengagement between said driven roller and said other two rollers so as to interrupt drive of the material through said washing section, each said washing section being housed in a separate chamber, said chambers being positioned side-by-side and wherein adjacent chambers have a common driving roller positioned transverse to the direction of travel of said elongate material.

3,977,221

## TAMPER-PROOF SET SCREW ASSEMBLAGE FOR LOCKING DEVICES

Daniel J. Foote, Wauwatosa, Wis., assignor to Master Lock Company, Milwaukee, Wis.

Filed Aug. 25, 1975, Ser. No. 607,290
Int. Cl.² E05B 73/00
U.S. Cl. 70—58 5 Claims



1. In combination, a locking device which includes a pair of complementary members; means for securing said members in impinging relationship including: a set screw threadably carried by one of said members and having an inner shank portion engageable with a portion of one of said members to releasably hold it in a desired relation relative to the other of said members, the first mentioned member having enclosed means for controlling the authorized actuation of the set screw; a sleeve freely turnably carried by a possibly exteriorally accessible portion of the set screw shank and inwardly of its extremity to block possible engagement of said portion of the set screw shank by an instrumentality unauthorizedly applied thereto by a tamperer whereby the sleeve will turn freely on the set screw shank to prevent unauthorized turning of the latter; and means on the set screw shank capping said sleeve to prevent removal of the sleeve from said portion of the set screw shank.

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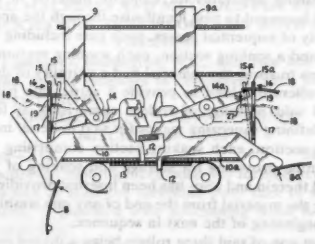
3,977,222

## LOCKING DEVICE

Harry E. Luperti, Wilton, and Lawrence J. Kresan, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Aug. 22, 1975, Ser. No. 606,965
Int. Cl.² E05B 37/12, 37/16
U.S. Cl. 70—292 7 Claims



1. A combination locking device of the type having a tape containing a plurality of predetermined reference combinations serially disposed thereon, said tape being advanced to a new reference combination position for each unlocking operation performed upon said device, a new combination being entered into said locking device for each unlocking operation, which newly entered combination being required to complement a new predetermined reference combination which has been advanced upon said tape in order to unlock a lock of said locking device, the combination locking device comprising:

operative means for moving a gate of said device from a locking position to an unlocking position;

a gate operatively connected to said operative means and movable between said locking and unlocking positions in response to actuation of said operative means;

a set of tumbler levers disposed adjacent said gate, said levers each being settable between a complementary position and a non-complementary position so as to provide for the setting of the entered combination into said device, said levers allowing movement of said gate from said locking position when the entered combination complements the reference combination, the tumbler levers otherwise operatively restraining movement of said gate from said blocking position; and

isolation means operatively disposed between the tumbler levers and said gate for preventing engagement of the gate with said tumbler levers, when said operative means is actuated and when said tumbler levers are positioned to provide an entered combination that is non-complementary with said reference combination.

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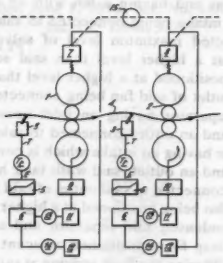
3,977,223

## HOT STRIP MILL TENSION CONTROL

William John Edwards, Newcastle, Australia, assignor to John Lysaght (Australia) Limited, Sydney, Australia

Filed Apr. 1, 1975, Ser. No. 563,984
Claims priority, application Australia, Apr. 2, 1974, 7117/74
Int. Cl.² B21B 37/06
U.S. Cl. 72—17 7 Claims

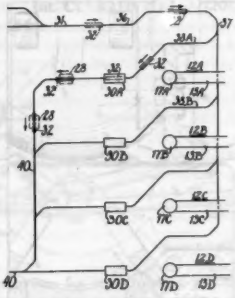


1. A method of controlling strip tension or looper position between a first stand and an adjacent downstream second stand of a hot strip rolling mill, at which stands the thickness of said strip is progressively reduced, comprising sensing said looper position, comparing said position with a predetermined value or range, and simultaneously adjusting the roll separation and driving speed in said second stand in response to deviation of said position from said predetermined value or range; the magnitudes of said adjustments of roll separation and drive speed being related by a predetermined function of the dimensions of said strip at each of said stands, hardness of said strip, stiffness of said stands, motor characteristics and the drive speeds of said stands.

## 3,977,224
## CONVEYING SYSTEMS

**Derek Stubbins, Sheffield, England, assignor to Davy-Loewy Limited, England**

**Filed June 9, 1975, Ser. No. 584,979**
**Claims priority, application United Kingdom, June 12, 1974, 26036/74**
**Int. Cl.² B21F *21/00*; B21C *47/24*, *47/26***
**U.S. Cl. 72—201** **7 Claims**



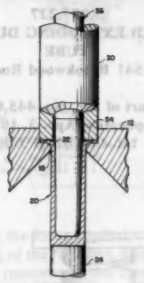
1. In a rod treatment line comprising in sequence:
a rod conveyor on which the rod is carried in open loop form while subjected to controlled cooling,
a coil forming device for forming the rod from the rod conveyor into coils,
a loading station,
a coil loader for moving the coils from the coil forming device to said loading station with the axes of the coils horizontal, and
a coil conveying system for conveying the coils away from the loading station,
the improvement according to which said coil-conveying system comprises:
a conveying track having a delivery portion which leads away from said loading station and an approach portion which runs from the direction of the rod conveyor past the coil forming device as it approaches said loading station, and
a number of coil-supporting hooks, each of which is suspended from the track, aligned with the direction of the track, and so mounted that, after reaching the loading station via said approach portion, it is pointed toward the coil-forming device.

## 3,977,225
## FORGING METHOD

**Richard Couchman, Clearwater, Fla., assignor to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Mar. 27, 1975, Ser. No. 562,867**
**Int. Cl.² B21C *23/20***
**U.S. Cl. 72—265** **13 Claims**

1. A method of forging elongated shells of precisely controlled interior dimension including the steps of:
positioning a work blank within a die;
exerting a first axially directed force on said work blank to stress said work blank close to the stress required for extrusion;
exerting a second axially directed force on said work blank sufficient to extrude a first portion of said work blank through said die simultaneously with the exertion of said first force;
exerting a third axially directed force on said work blank in a direction opposite to said second force;
continuing said second and third axially directed forces and simultaneously increasing said first axially directed force sufficient to extrude a second portion of said work blank through said die;
decreasing said first axially directed force;
exerting an ironing force on said work blank being forged simultaneously with said continuing second and third

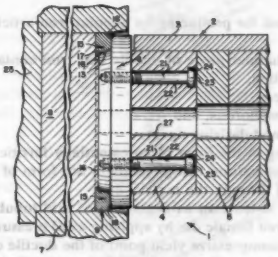


forces; said first, second, third, and ironing forces combining to stress said work blank sufficient to significantly increase the ductility thereof, whereby said elongated shell may be forged in a continuous operation;
removing all of said forces upon completion of said shell.

## 3,977,226
## SEALING DEVICE FOR INDIRECT EXTRUSION DIE

**Alfred W. Mann, Rockwall, and Jack B. Strother, Terrell, both of Tex., assignors to Texas Extrusion Corporation, Rockwall, Tex.**

**Filed Mar. 24, 1975, Ser. No. 561,641**
**Int. Cl.² B21C *25/00***
**U.S. Cl. 72—273** **17 Claims**



1. In combination:
a. a container providing an internal chamber adapted for receipt of a billet of material to be extruded;
b. means for sealing one end of said container;
c. a hollow elongated ram disposed coaxially with said container chamber adjacent its open end;
d. a die providing orifice means,
1. said die being positioned on one end of said ram so that upon relative movement of said container and die under extrusion forces and in extrusion direction, said billet material is extruded through said orifice means and passed through said ram; and
e. a sealing element removably positioned in cooperating relationship with said die for movement with said die during the extrusion of said billet material,
1. said sealing element having an outer surface positioned in sliding sealing engagement with the inner wall surface container during an extrusion stroke and locating said die within and spaced from said inner wall surface, and

2. said sealing element including a radially inwardly directed lip overlying the forward face of the die to cover the line of juncture between the adjacent surfaces of said die and sealing element to prevent said billet material from extruding therebetween.

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3,977,227

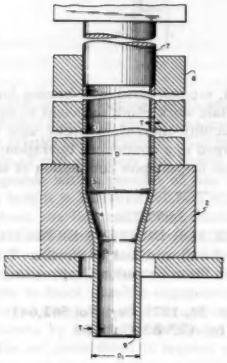
## METHOD OF COLD EXTRUDING DUCTILE CAST IRON TUBE

Charles H. Noble, 3541 Brookwood Road, Birmingham, Ala. 35223

Continuation-in-part of Ser. No. 445,655, Feb. 25, 1974, abandoned. This application Apr. 3, 1975, Ser. No. 564,608

Int. Cl.² B21D *3/00*

U.S. Cl. 72—367 16 Claims



1. The method for producing an annular iron article, comprising:

providing a tubular piece of ductile cast iron containing

1–4.25% carbon,

1–4.25% silicon,

0–0.20% phosphorous, and

at least one nodularizing agent,

the iron being in the form of an essentially ferritic matrix, and the free carbon being mainly in the form of nodules distributed through the matrix; and

cold extruding at least an axial portion of said tubular piece through a tapered female die by applying axial pressure to the piece until the compressive yield point of the ductile cast iron is reached and the metal is caused to traverse the die in plastic flow while maintained under hoop compression, whereby said carbon nodules are flattened and arranged in planes which are parallel to the axis of extrusion, and the grain structure of the iron is extended in the direction of extrusion and in directions parallel to said planes.

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3,977,228

## TOOL FOR FORMING PIPE FROM SHEET METAL

Josef Ferwagner, Bochum, Germany

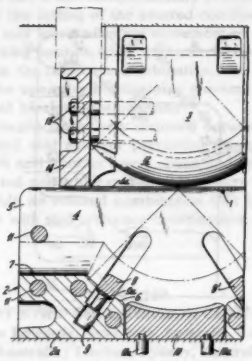
Filed Aug. 16, 1974, Ser. No. 498,283

Claims priority, application Germany, Aug. 18, 1973, 2341857

Int. Cl.² B21D *17/02*

U.S. Cl. 72—384 5 Claims

1. A tool for forming pipe from sheet metal comprising a preforming die having a pair of opposed transversely spaced longitudinal walls with top flat surfaces for supporting a sheet to be formed and with substantially vertical inside opposed die surfaces spaced apart by a distance corresponding to the outside diameter of the pipe bend being formed, said walls also having a shaped part corresponding to the back of the pipe bend being formed between said surfaces and a stop surface at each end of said shaped part extending above the shaped part, a pair of transversely spaced segments overlying said shaped part, means connected to said segments for displacing them inwardly and outwardly radially for varying the point at which they engage the sheet to be formed into the



pipe, the drawing punch overlying said die having a hold-down element at each end engageable with a respective stop surface to hold the sheet thereon and having a shaped punch part adjacent its bottom corresponding to the inside shape of the back of the pipe being made with a punch surface on each side of said shaped punched part substantially parallel to said inside opposed die surfaces, said segments being movable radially outwardly up to the level of said stop surfaces.

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3,977,229

## ANVIL FOR BLIND RIVETING TOOL

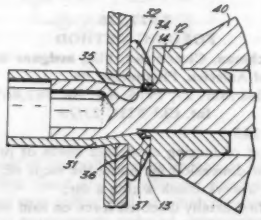
Zea Raheem Alvi, Hatfield; William David Bradley; Keith Denham, both of Welwyn Garden City, and Frederick Arthur Summerlin, Wheathampstead, all of England, assignors to Aerpat A.G., Zug, Switzerland

Filed Sept. 10, 1975, Ser. No. 612,007

Claims priority, application United Kingdom, Sept. 13, 1974, 39985/74

Int. Cl.² B21J *15/34*

U.S. Cl. 72—391 8 Claims




1. An annular anvil for a blind riveting tool, which anvil is in the form of a tubular body having an aperture for receiving the stem of a mandrel of a self plugging blind rivet, an annular abutment face surrounding the aperture for abutting the shell of a blind rivet, and an annular rim surrounding the aperture and radially within the annular abutment face and projecting forwardly of the abutment face, said annular rim having a front end face which inclines rearwardly and outwardly for

engaging a lip on the mandrel stem and swaging the lip radially outwardly to engage the rivet shell, said front end face having a plurality of recesses spaced apart circumferentially around it.

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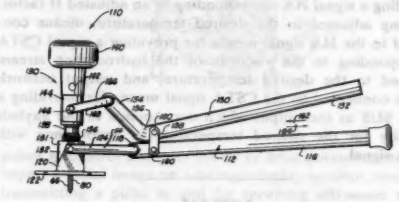
**3,977,230**

## APPARATUS FOR REPAIRING INDENTIONS IN A RIGID SKIN

**Noel C. Jones, 422 S. 13th St., Frederick, Okla. 73542**

**Filed June 20, 1974, Ser. No. 481,168**
**Int. Cl.² B21D *1/12, 11/20***
**U.S. Cl. 72—461** **2 Claims**



1. In an apparatus for straightening a dent in a metal skin wherein a dent-engaging member having a shank and a dent contacting portion engagingly pulls the dent from a depressed profile, the improvement comprising:

a first yoke member having a pair of tines;

a first handle member connected to the first yoke member;

a base plate having a relief aperture therethrough, the tines of the first yoke member connected to the base plate at opposite sides thereof;

chuck means for gripping the shank of the dent-engaging member and for positioning the dent contacting portion for clearing movement through the base plate aperture;

a second yoke member having a pair of tines, the tines pivotally connected to the chuck means;

a second handle member connected to the second yoke member; and,

link means for pivotally connecting the first and second handle members at one end each thereof whereby the pivotation of the first handle member relative to the second handle member moves the chuck means selectively towards or away from the base plate whereby movement of the second handle member relative to the first handle member selectively tilts the chuck means relative to the base plate.

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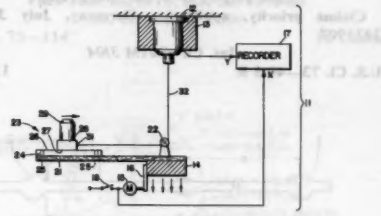
**3,977,231**

## STATIC COEFFICIENT TEST METHOD AND APPARATUS

**Carl L. Haehner, Dayton, and John L. Tarpley, Rockville, both of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed June 9, 1975, Ser. No. 585,420**
**Int. Cl.² G01N *19/02***
**U.S. Cl. 73—9** **11 Claims**

1. A method of determining the static coefficient of friction between contacting surfaces of a plurality of bodies comprising the steps of applying a preselected constant load to the bodies normal to the contacting surfaces, fixedly connecting one portion of a flexible filament to a first of the bodies, another portion of the filament being fixedly connected to a stationary cross head, continuously moving a second of the bodies substantially vertically away from the stationary cross head at constant velocity while the one portion of the filament is connected through a guiding means to pull on the first body at right angles to the normal load so that the first body alternately is moved and then stopped relative to the second body across the contacting surfaces between the first and second bodies and the filament is alternately and cyclically tensioned and relaxed as the first body alternately is moved and then stopped, the maximum tension occurring at incipient stages of movement of the first body relative to the second body, measuring and recording the force applied to the first body at said maximum tensioning of the filament, and calculating the coefficient of friction in response to the measured forces and the force of the normal preselected constant load on the bodies with respect to time.

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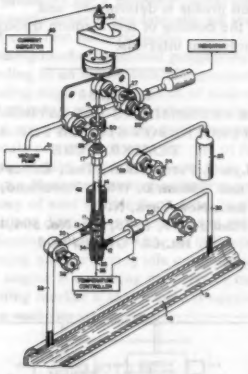
**3,977,232**

## DIFFUSION-TYPE HYDROGEN METER

**William M. Hickam, Pittsburgh; Robert E. Witkowski, West Mifflin, and Edgar Berkey, Murrysville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 30, 1972, Ser. No. 239,614**
**Int. Cl.² G01N *7/10***
**U.S. Cl. 73—19** **6 Claims**



1. A system for measuring the concentration of a gas in a flowing fluid, comprising in combination:

a. means for diverting a small portion of said flowing fluid into a measurement loop;

b. a membrane permeable to said gas positioned such that a portion of said gas diffuses through said membrane from said portion of said fluid which flows through said measurement loop;

c. means, responsive to said gas, for producing a signal indicative of the rate at which said gas diffuses through said membrane; and

d. means permitting said membrane to be changed without interrupting the flow of said liquid, said means including two valves for isolating said fluid in said measurement loop from the fluid in the remainder of the system and means for protecting the fluid in said measurement loop from contact with the atmosphere when said membrane is removed from said measurement loop.

3,977,233

## PROCESS AND APPARATUS FOR THE DETERMINATION OF CONCENTRATION PROFILES OF LIQUID OR GASEOUS SUBSTANCES

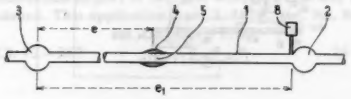
Wolfgang Issel, Bahnhofstrasse 2, 75 Karlsruhe 1, Germany

Filed July 3, 1975, Ser. No. 592,877

Claims priority, application Germany, July 3, 1974, 2431907

Int. Cl.² G01M 3/04

U.S. Cl. 73—40.5 R 11 Claims




3. A process for the determination of concentration profiles of crude oil or gas along a pipeline installation transporting said crude oil or gas comprising the steps of:

a. laying a length of hollow conduit in a direction substantially parallel to said pipeline and filled with a column of test medium, said hollow conduit being constructed to permit diffusion of said crude oil or gas thereinto whereby a distribution corresponding to the concentration profile to be determined is established in said test medium;

b. providing a sensor sensitive to said crude oil or gas, said sensor being in communication with the interior of said hollow conduit;

c. establishing an equilibrium between any crude oil or gas outside of said hollow conduit and any crude oil or gas diffused into said test medium in said hollow conduit;

d. moving the column of test medium and any crude oil or gas diffused thereinto past said sensor whereby said concentration profile is determined; and

e. pushing the column of test medium through said conduit at chronological intervals.

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3,977,234

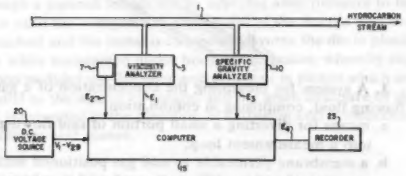
## MEANS FOR DETERMINING THE SAYBOLT VISCOSITY OF A HYDROCARBON STREAM FOR A DESIRED TEMPERATURE

Charles R. Lynch, Port Arthur, Tex.; Edward A. Copeland, Joliet, Ill., and William D. White, Nederland, Tex., assignors to Texaco Inc., New York, N.Y.

Filed July 9, 1975, Ser. No. 594,473

Int. Cl.² G01N 11/00

U.S. Cl. 73—53 10 Claims




1. A system for providing an output corresponding to the Saybolt viscosity of a hydrocarbon stream for a desired temperature, comprising means for sensing the specific gravity of the hydrocarbon stream and providing a signal SG corresponding thereto, means for sensing the temperature of the hydrocarbon stream and providing a signal T representative thereof, means for sensing the viscosity of the hydrocarbon stream and providing a corresponding signal VCP, means connected to the specific gravity sensing means and to the temperature sensing means for providing a signal corresponding to a specific gravity CSG corrected to a predetermined temperature in accordance with the T and SG signals, means connected to the CSG signal means for providing a signal CAPI corresponding to an API gravity corrected to the predetermined temperature in accordance with the CSG signal, means connected to CAPI signal means for providing a signal SL corresponding to a slope factor in accordance with the CAPI signal means connected to the viscosity sensing means and to the specific sensing means for providing a signal VCST corresponding to the viscosity of the hydrocarbon stream in centistokes in accordance with the SG and VCP signals, means connected to the VCST signal means for providing a signal H corresponding to an H factor in accordance with the VCST signal, means connected to the H signal means, to the SL signal means and to the temperature sensing means for providing a signal HA corresponding to an adjusted H factor, H being adjusted to the desired temperature, means connected to the HA signal means for providing a signal CSTA corresponding to the viscosity of the hydrocarbon stream adjusted to the desired temperature, and output network means connected to the CSTA signal means for providing a signal SUS as the output which corresponds to the Saybolt viscosity for the desired temperature in accordance with CSTA signal.

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3,977,235

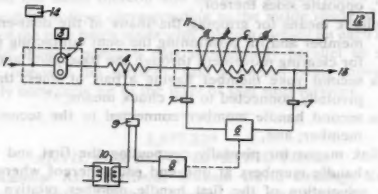
## VISCOMETER

William Henry Topham, Rochester, England, assignor to The British Petroleum Company Limited, London, England

Filed Mar. 3, 1975, Ser. No. 555,035

Int. Cl.² G01N 11/00

U.S. Cl. 73—54 9 Claims



1. A liquid monitoring apparatus comprising: a constant volume flow rate pump operated by a prime mover; said pump being connected in series with a heater and a hydraulic resistance; a differential pressure transmitter being connected across the resistance; the transmitter being connected to a controller adapted and arranged to adjust the power supplied to the heater in response to an electrical signal from the differential pressure transmitter in such a manner that the power supplied to the heater enables a pre-determined differential pressure to be maintained across the hydraulic resistance; at least one temperature sensing device connected with the hydraulic resistance to measure the temperature of the liquid, whereby the temperature of the liquid at a predetermined viscosity is monitored.

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3,977,236

## APPARATUS AND METHOD FOR ULTRASONIC FASTENER HOLE INSPECTION

Charles F. Raatz, Jr.; Russell K. Woodbury, and Wayne E. Woodmansee, all of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.

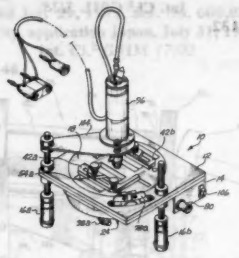
Filed Oct. 21, 1974, Ser. No. 516,538

Int. Cl.² G01N 29/04

U.S. Cl. 73—67.8 S 13 Claims

6. An apparatus for ultrasonic inspection of a fastener hole without removing the fastener, the apparatus having a scanning device comprising: an adjustable frame, a circular carrier rotatably mounted in the frame, means for adjustably mount-

ing and directing in the carrier at least one transducer capable of ultrasonic transmitting and receiving, means for rotating the carrier, and means for converting carrier rotation into electrical pulses; and the apparatus also having a control and display device comprising: means for utilizing the electrical



pulses to control a stepper motor to drive potentiometers and impart a radial image on a storage display monitor, means for transmitting a pulse to and for receiving ultrasonic echoes from the transducer, means for utilizing the signal from the echo through a time gate for imparting deflection to the radial image in response to flaws detected.

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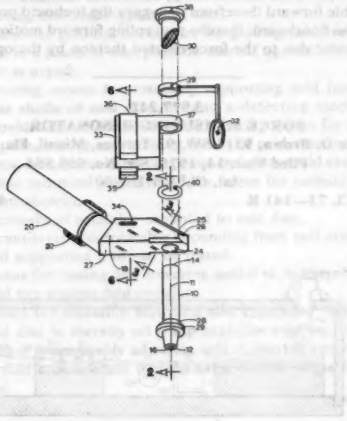
**3,977,237**

## TONOMETER

**Julius Michael Tesi, Buckeye Lake, Ohio, assignor to Julius M. Tesi**

**Filed July 14, 1975, Ser. No. 595,779**
**Int. Cl.² A61B 3/16**
**U.S. Cl. 73—80** **8 Claims**



1. An applanation tonometer including a transparent piston having a central axis extending from a flat, lower-end surface adapted to rest on the eye of a patient to an upper-end surface, a source of light and holder means for supporting said piston above the eye and guiding it into contact with the eye so that an area of the eye may be applaned by the lower-end surface of the piston;

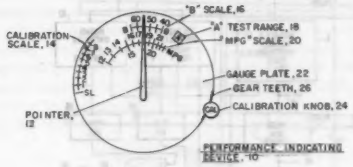
conduit means in said holder means for conducting light from said source to the surface of said piston, notch means in the surface of said piston for (1) receiving and transmitting a portion of said light downward within the piston to its lower end surface and (2) reflecting another portion of said light radially of said piston.

**3,977,238**

## MOTOR VEHICLE ECONOMY MEASURING INSTRUMENT

**Melville R. Byington, Jr., 8620 Camden St., Alexandria, Va. 22308**

**Filed June 16, 1975, Ser. No. 587,080**
**Int. Cl.² G01M 15/00**
**U.S. Cl. 73—114** **18 Claims**




1. A device for permitting the operator of a motor vehicle powered by an internal combustion engine to continuously monitor the fuel economy and operating efficiency of said vehicle comprising in combination:

a gauge plate;

means for measuring the relative pressure in the intake manifold of said engine, said measuring means comprising visual indicating means responsive to said pressure;

a first numeric scale upon said gauge plate, said first numeric scale being calibrated to provide an indication of the amount of fuel consumed by said engine per unit of distance travelled by said vehicle;

a second numeric scale upon said gauge plate, said scale being calibrated in units of speed corresponding to intake manifold pressures for a properly operating engine, said second numeric scale being laterally adjacent at least a portion of said first numeric scale;

an idle indicating marker upon said gauge plate, said marker corresponding to an intake manifold pressure for a properly operating engine at idle speed of said engine; and

said visual indicating means providing simultaneously during operation of said vehicle an indication upon said first numeric scale corresponding to the rate of fuel consumption and upon said second numeric scale indicating to said operator the speed corresponding to proper operating economy of said vehicle for a level road and normal load conditions during movement of said vehicle and said visual indicating means providing an indication upon said idle indicating marker during idle conditions of said vehicle if said engine is operating properly or outside of said idle indicating marker if said engine is operating improperly during said idle conditions.

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**3,977,239**

## ENGINE DIAGNOSIS FROM FREQUENCY COMPONENTS IN EXHAUST

**Leonard Robin Hulls, Middlesex, and Stephen Clow Hadden, Acton, both of Mass., assignors to RCA Corporation, New York, N.Y.**

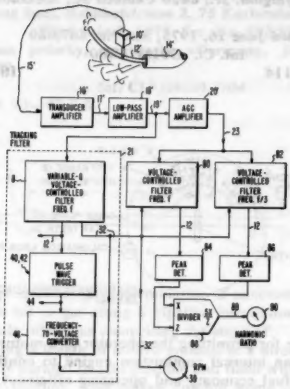
**Filed Jan. 2, 1976, Ser. No. 646,388**
**Int. Cl.² G01M 15/00**
**U.S. Cl. 73—115** **8 Claims**

1. An engine diagnostic apparatus, comprising:

transducer means for translating a pressure waveform emitted by an engine to a corresponding complex electrical signal having a prominent fundamental frequency component which varies in frequency in direct proportion with engine speed, and having a subharmonic frequency component at a frequency which is a submultiple of said fundamental frequency,

separator means to separate said subharmonic frequency, components and said fundamental frequency component

from said complex electrical signal and from each other, and




comparator means to compare the amplitude of said subharmonic frequency component with the amplitude of said fundamental frequency component to provide a measure of the unevenness of power strokes from individual cylinders of the engine.

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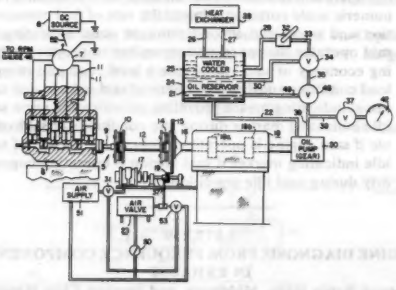
**3,977,240**

**ENGINE TEST SYSTEM**

**Daniel B. Eichinger, deceased, late of Philadelphia, Pa., by Regina M. Eichinger, widow, 8508 Harley Ave., Philadelphia, Pa. 19153**

**Filed Feb. 1, 1971, Ser. No. 111,484**
**Int. Cl.² G01M** *15/00*
**U.S. Cl. 73—116** **5 Claims**




1. Apparatus for testing performance of a power producing device having a rotary shaft output comprising:

a. pneumatically-actuated means adapted to be releasably coupled to said shaft for starting said device, said means including a first gear coupled to said output shaft and a pneumatically-actuated second gear which moves into engagement with said first gear to start said device, and

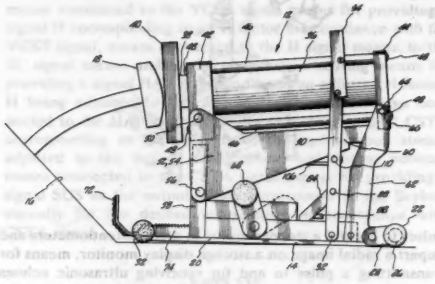
b. means including a stationary, constant displacement hydraulic gear pump coupled to said shaft and presenting an adjustable load for said device, said (b) means including at least one valve coupled to the output of said pump for adjusting the hydraulic pressure output thereof and also including stationary heat-exchange means for cooling the hydraulic fluid appearing at the output of said pump.

**3,977,241**

**ACTUATOR UNIT FOR VEHICLE BRAKE TESTING**

**Carl Junior Asmus, and Woodrow Christman Wickersham, both of Temple City, Calif., assignors to Clayton Manufacturing Company, El Monte, Calif.**

**Filed Apr. 11, 1975, Ser. No. 567,286**
**Int. Cl.² G01L** *5/28*
**U.S. Cl. 73—132** **9 Claims**



9. For use as a vehicle testing means, a portable actuator unit which may be temporarily placed in the vehicle operator's compartment, and which may be used to apply controlled force to a vehicle control member normally actuated by the vehicle operator comprising:

a frame supportable on the generally horizontal portion of the vehicle floorboard;

an actuator supported on the frame and adapted to engage and move the vehicle control member during a testing stroke; and

an adjustable extension supported on the frame and movable forward therefrom to engage the toeboard portion of the floorboard, thereby preventing forward motion of the frame due to the force exerted thereon by the operator.

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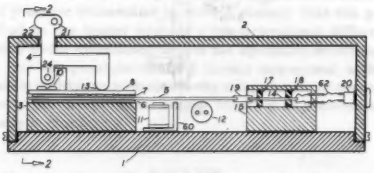
**3,977,242**

**FORCE MEASURING RESONATOR**

**Horace D. Brown, 9317 SW. 93 Terrace, Miami, Fla. 33176**

**Filed Mar. 14, 1975, Ser. No. 558,554**
**Int. Cl.² G01L** *1/00*
**U.S. Cl. 73—141 R** **4 Claims**



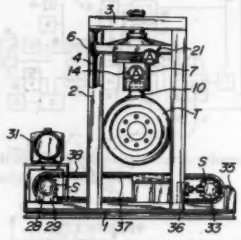
1. A force sensor comprising: support means, a vibratory element mounted on said support means and maintained normally in a nonresonant condition, a vibrator exciter means secured relative to said support means in spaced relation to said vibratory element, a force bearing means, resilient means interposed between said force bearing means and said vibratory element to alter the said nonresonant condition of said vibratory element to a varying degree of resonance and consequent varying intensity of vibration which will track a varying magnitude of force applied to said force bearing means.

3,977,243

## TESTING MACHINE FOR TIRES ON IMITATION ROADS

Hirozi Yamada, Kyoto; Hiroshi Ogawa, Kodaira; Satoru Aono, Higashi-Murayama, and Hironori Hirano, Akigawa, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed July 29, 1975, Ser. No. 600,024
Claims priority, application Japan, July 31, 1974, 49-88246
Int. Cl.² G01M 17/02
U.S. Cl. 73—146 14 Claims



1. A testing machine for urging an automobile tire against an imitation road surface, comprising:

a. a crawler comprising an endless chain supported by front and rear shafts and a plurality of flat rods arranged side by side and detachably secured to said endless chain to form an imitation road surface;

b. a mechanism connected to one of said crawler shafts for driving and braking said crawler;

c. a crawler guiding mechanism for guiding said crawler to run in a plane at that position thereof against which said tire is urged;

d. bearing means for rotatably supporting said front and rear shafts of said crawler, and a detecting mechanism provided for at least one of said bearing means for detecting the driving and braking forces of said crawler;

e. a machine frame extending over and above said crawler,

f. a disc mounted in said machine frame for vertical movement therein,

g. a crosshead rotatably mounted to said disc,

h. a cantilever arm rotatably depending from said crosshead and supporting a tire to be tested,

i. means for raising and lowering said disc to thereby urge said tire against said crawler,

j. means for rotatably adjusting said crosshead relative to said disc to thereby set a slip angle for said tire, and

k. means for rotatably adjusting said cantilever arm relative to said crosshead to thereby set a camber angle for said tire.

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3,977,244

## INFRARED TECHNIQUE FOR AERODYNAMIC FLOW VISUALIZATION

Michael B. Stone, 3257 Victor Circle, Annandale, Va. 22003

Filed June 4, 1974, Ser. No. 476,166
Int. Cl.² G01M 9/00
U.S. Cl. 73—147 3 Claims

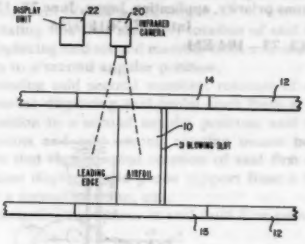
1. A method of visualizing the fluid stream around an object mounted in a fluid circulating facility comprising the steps of:

placing an object within a fluid circulating facility;

circulating a fluid within the facility and around said object;

establishing a temperature difference between said fluid and said object;

detecting the infrared radiation from the fluid and the object with an infrared camera; and




displaying the detected infrared radiation pattern of the fluid stream around the object.

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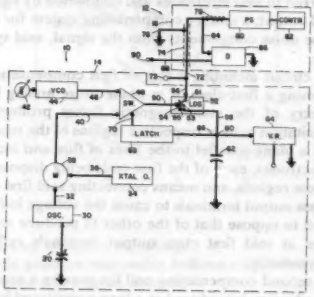
3,977,245

## DOWN HOLE APPARATUS FOR SENSING AND STORING VALUES OF PHYSICAL PARAMETERS

Kenneth K. Clark, and James C. Harper, both of Tulsa, Okla., assignors to Geophysical Research Corporation, Tulsa, Okla.

Continuation-in-part of Ser. No. 569,945, April 21, 1975. This application Sept. 29, 1975, Ser. No. 617,292
Int. Cl.² E21B 47/06
U.S. Cl. 73—151 21 Claims




1. Apparatus for use in deep boreholes in the earth for sensing, digitizing and storing values of physical parameters of the earth, comprising:

a. a pressure tight housing, and means to position said housing at a selected point in said borehole, and to retrieve said housing;

b. means to convert a physical parameter in said borehole to an electrical signal of selected characteristic;

c. means to digitize said electrical signal at successive spaced intervals of time to digital numbers representative of the values of said parameter at said successive times; and

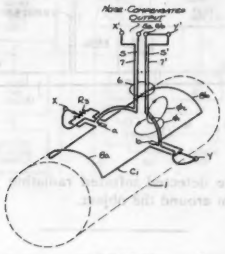
d. digital storage means in said housing to store said digital numbers.

3,977,246

## MAGNETIC FLOWMETER HAVING IN PHASE NOISE COMPENSATION

Masayasu Watanabe, Yokohama, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed June 17, 1975, Ser. No. 587,687
Claims priority, application Japan, June 28, 1974, 49-74697
Int. Cl.² G01F 1/58
U.S. Cl. 73—194 EM 6 Claims



1. In an electromagnetic flowmeter provided with a flow tube through which is conducted the liquid to be metered, excitation coils to establish a magnetic field in the tube transverse to the direction of flow and a pair of electrodes disposed at diametrically opposed positions, whereby flowing liquid intersecting said field induces a signal in said liquid which is transferred to said electrodes and conducted by signal leads to a signal output; a unitary compensating system for eliminating in phase noise components from the signal, said system comprising:

A. a circuit including a pair of first compensating coils for sensing a first class of in-phase noise arising from asymmetry of the main magnetic fluxes produced by said excitation coils in respective regions of the tube separated by a plane parallel to the lines of flux and including said electrodes, each of the first coils being disposed in one of these regions, and means connecting said first coils to first class output terminals to cause the voltage induced in one coil to oppose that of the other to produce an error voltage at said first class output terminals reflecting said asymmetry;

B. a second compensating coil for sensing a second class of in-phase noise induced in a loop constituted by said signal leads in combination with the liquid in said tube bridging said electrodes, said noise being induced in said loop by reason of asymmetrical leakage magnetic fluxes arising from said asymmetrical main fluxes, said second coil being defined by said first compensating coils and a pair of lead wires;

C. common output terminals connected through said pair of lead wires of the second coil to said first class output terminals whereby yielded at said common output terminals is a combined error voltage reflecting both the first class noise resulting from asymmetry of the main magnetic fluxes and second class noise resulting from the leakage magnetic fluxes; and

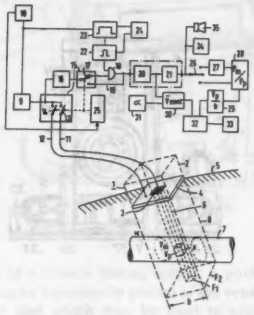
D. means to apply said combined error voltage developed at said common output terminals in opposition to the induced signal appearing at said signal output to provide a noise-compensating output which is corrected for said first and second class in-phase noises.

3,977,247

## ARRANGEMENT FOR THE MEASUREMENT OF THE FLOW VOLUME OF FLOWING MEDIA

Dieter Hassler, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Dec. 17, 1975, Ser. No. 641,572
Claims priority, application Germany, Dec. 23, 1974, 2461264
Int. Cl.² G01F 1/66
U.S. Cl. 73—194 A 15 Claims



1. In an arrangement for the measurement of the flow volume of flowing media, particularly blood in its vessels, pursuant to the Ultrasonic-Doppler method, including at least two ultrasound transmitter-receivers for at least the partial sounding of the volumetric section of a medium; a Doppler apparatus for determining the output power of the incident doppler signals during the at least partial sounding; and a ratio formulator for the output powers of said signals, the improvement comprising: a first one of said ultrasound transmitter-receivers partially sounding a volumetric section and being adapted to receive merely such doppler signals emanating from the flowing medium of a test volume having predetermined dimensions; a second one of said ultrasound transmitter-receivers fully sounding a total volumetric section, said test volume being located completely within said last-mentioned volumetric section; and said ratio formulator including means for forming the ratio of the power outputs of the doppler signals from the total volumetric section and the test volume.

3,977,248

## LINEARIZING ELEMENTS FOR VARIABLE AREA FLOWMETER

Joseph H. Metzger, Warminster, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

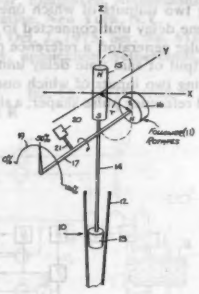
Filed Apr. 3, 1975, Ser. No. 564,668
Int. Cl.² G01F 1/24
U.S. Cl. 73—209 5 Claims

1. A rotameter system for indicating the flow rate of a fluid, said system comprising:

A. a primary element including a variable area flow tube through which is flowable the fluid to be measured and having a float and a bar magnet mechanically coupled to the float which is axially movable therewith along a vertical axis, said float being lifted or lowered in the tube as a function of flow rate in accordance with a non-linear hydraulic characteristic curve; and

B. a secondary element external to the variable area tube and including a rotatable follower magnet mounted on a shaft and positioned relative to the bar magnet whereby the axial movement of the bar magnet results in rotation of the follower magnet to a degree determined by the direction and extent of axial movement, and a mass ec-

centrically mounted on said shaft at a position relative to the axis thereof to produce a moment which compensates



for said hydraulic characteristic curve whereby said rotation is linearly related to flow rate.

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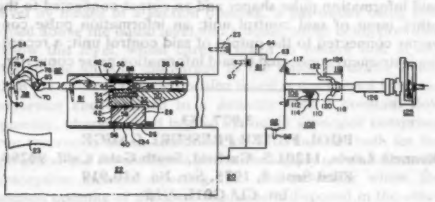
3,977,249

## PROBE MECHANISM FOR THREE DIMENSIONAL INVESTIGATION OF CONDITIONS IN A FLUID FLOW

Juergen Michael Wittig, Newton Square, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 14, 1974, Ser. No. 523,943
Int. Cl.[2] G01F 1/46
U.S. Cl. 73—212 5 Claims



1. A probe for three-dimensional investigation of conditions in a fluid flow path, said probe comprising:

an elongated tubular outer housing;

a first member rotatably and coaxially disposed within said outer housing, said first rotatable member including an elongated cylinder having a central axial opening extending therethrough, a collar having a radially outwardly extending flange portion thereon and a central axial opening extending therethrough, said collar being attached to said elongated cylinder so that the central axial opening in said collar aligns with the central axial opening extending through said elongated cylinder, a short cylinder attached to said elongated cylinder opposite collar, said short cylinder having an eccentrically disposed opening extending therethrough, the opening in said short cylinder communicating with the central axial opening extending through said elongated cylinder and said collar,

a second member rotatably disposed within the eccentric opening in said short cylinder, said second member having an eccentrically disposed opening extending through a portion thereof;

an elongated probe support member rotatably and slidably disposed within the opening in said second member;

a movable probe finger pivotally attached to said probe support member;

a sensing head member rigidly attached to said probe finger member, said sensing member having a sensing orifice therein;

first means for axially displacing said probe finger member from a first axial position to a second axial position;

second means for angularly displacing said probe finger from a first angular position to a second angular position;

third means for displacing said probe finger from a first orientation to a second orientation with respect to said pivotal attachment of said probe finger;

means for rotating said first member, rotation of said first member displacing said second member from a first angular position to a second angular position;

means for rotating said second member, rotation of said second member displacing said probe shaft from a first angular position to a second angular position, said first rotating means and said second rotating means being disposed so that simultaneous rotation of said first and second means displaces said probe support from a first position to a second position; and,

means for monitoring conditions in said fluid flow path.

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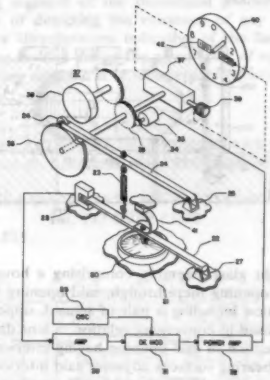
3,977,250

## ENCODING ALTIMETER

Thomas S. Amlie, 6415 Bradley Blvd., Bethesda, Md. 20034

Filed May 2, 1975, Ser. No. 574,115
Int. Cl.[2] G01L 7/12
U.S. Cl. 73—386 1 Claim



1. An encoding altimeter including;

a barometric pressure-responsive bellows responsive to the static pressure at a given altitude;

electronic null sensing means for producing an output signal;

connecting means connected to said bellows and coacting with said null sensing means so that a change in static pressure results in an output signal representative of the change from said null sensing means;

said connecting means normally being in a null position with respect to said null sensing means;

power amplifying means operatively receiving the output signal from said null sensing means;

motor means operatively connected to said power amplifying means;

said motor means producing an output in response to a change in static pressure as detected by said null sensing means;

a feedback loop operatively connected from said motor means to said bellows for returning said connecting means to a null position with respect to said null sensing means;

said feedback loop comprising a cam operatively connected to said motor means and moveable under the influence thereof;

said cam having a profile corresponding to Ry = Ro Py/Po where Ry corresponds to the altitude at sea level or 1, Py =the pressure at a given altitude and Po = the pressure at sea level;

means operatively connected between the cam profile and the connecting means for causing said connecting means to return to a null position under influence of movement of the cam;

encoding means operatively connected to said motor means for outputting a signal indicative of static pressure at a given altitude;

said encoding means comprising two interconnected encoding disc;

one disc being directly interconnected with said motor means and said other disc being driven by a Geneva mechanism from said first encoding disc so that the two discs turn at a predetermined ratio with respect to each other.

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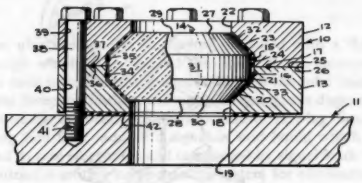
**3,977,251**

## SIGHT GLASS ASSEMBLY

**Charles E. Meginnis, 591 1/2 Nancy St., Charleston, W. Va. 25302**

**Filed Nov. 2, 1973, Ser. No. 412,256**
**Int. Cl.² G01F *23/02***
**U.S. Cl. 73—334** **19 Claims**



1. A sight glass assembly comprising a housing structure having an opening therethrough, said opening having an enlarged section including a pair of spaced, opposed wall portions, disposed in converging relation, a lens disposed in said enlarged section of said opening having interior and exterior faces and bearing surfaces adjacent said interior and exterior lens faces cooperable with said wall sections, and resilent sealing means interposed between said wall portions of said enlarged section of said opening and said bearing surfaces of said lens whereby upon application of pressure on one of said lens faces, said sealing means disposed between the nearer lens bearing surface and a cooperating housing wall portion, will function to provide an initial sealing action, and said sealing means disposed between the further lens bearing surface and a cooperating housing wall portion, will function to provide an additional, main sealing action.

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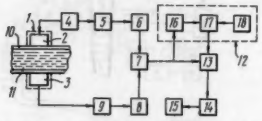
**3,977,252**

## METHOD AND APPARATUS FOR CONTROLLING LIQUID PRESSURE IN PIPELINES

**Eleonora Dmitrievna Krylova, Beskudnikovsky bulvar, 32, korpus 2, kv. 32, and Nikolai Ivanovich Brazhnikov, ulitsa 1 Bebelya, 3, korpus 11, kv. 48, both of Moscow, U.S.S.R.**

**Filed Nov. 21, 1975, Ser. No. 633,962**
**Claims priority, application U.S.S.R., Nov. 21, 1974, 2077127**
**Int. Cl.² G01L *9/00***
**U.S. Cl. 73—398 R** **11 Claims**

7. an apparatus for controlling liquid pressure in pipelines using ultrasonic oscillations comprising: an ultrasonic measuring converter; an ultrasonic emitter of said ultrasonic measuring converter mounted on the outer surface of said pipeline; an ultrasonic receiver of said ultrasonic measuring converter mounted on the outer surface of said pipeline; a driving pulse generator having two outputs of which one is connected to said emitter; a time delay unit connected to the other output of said driving pulse generator; a reference pulse shaper connected to the output of said time delay unit; an information pulse shaper having two inputs of which one is connected to the output of said reference pulse shaper; a signal pulse shaper



having an output connected to said information pulse shaper; an amplifier having an input connected to said ultrasonic receiver and an output connected to the input of said information pulse shaper; a control unit for controlling the amplitude of information pulses having two inputs of which one is connected to the output of said information pulse shaper; a control signal shaper having an input connected to the output of said information pulse shaper and an output connected to the other input of said control unit; an information pulse converter connected to the output of said control unit; a recording instrument connected to said information pulse converter.

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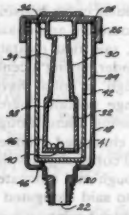
**3,977,253**

## POOL FILTER PRESSURE GAUGE

**Kenneth Lewis, 11201 S. Garfield, South Gate, Calif. 90280**

**Filed Sept. 8, 1975, Ser. No. 610,919**
**Int. Cl.² G01L *7/18***
**U.S. Cl. 73—401** **14 Claims**



1. A pressure gauge for a pool filter or the like, comprising:

a housing, connecting means having a passage for connecting the bottom of the housing to a source of liquid under pressure, a removable cap at the top of the housing, a transparent tube extending vertically in the housing, the tube being closed at the top and open at the bottom, and a transparent cup inside the housing, the tube extending down into the cup, at least a portion of the housing being transparent whereby the level of liquid in the tube is visible from outside the housing.

3,977,254

## APPARATUS FOR SAMPLING FOR USE IN A CONTINUOUS DETERMINATION OF A COMPONENT IN A GAS MIXTURE

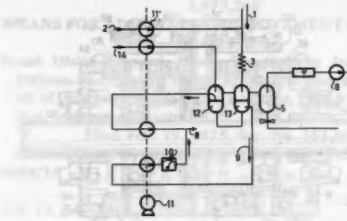
**Harm Jan Brouwer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 2, 1975, Ser. No. 618,770**

**Claims priority, application Netherlands, Oct. 22, 1974, 7413796**

**Int. Cl.² G01N *1/00***

**U.S. Cl. 73—422 R** **1 Claim**



**1.** Apparatus for continuous sampling for use in a continuous determination of a gaseous component in a gas mixture, in which apparatus at least the component to be determined is absorbed in a liquid and determination is performed on the resulting doped liquid, which apparatus comprises an absorption member to which a constant stream of sample gas and a constant stream of absorption liquid are supplied and in which the two streams are brought into contact with one another, and a passage to a liquid separator having a constant liquid level by means of a suction opening, a gas outlet being provided above the liquid level and a liquid outlet being provided below this level, whilst care is taken to ensure that at any instant the amount discharged to the liquid separator is less than the amount supplied, whilst liquid is discharged from the separator and supplied to a detector with a constant flow quantity, characterized in that the liquid separator comprises two reservoirs which communicate with another both for the gas phase and for the liquid phase, the supply conduit from the absorption member opening into one reservoir whilst the suction opening of the level-regulator is disposed in the other reservoir, to which latter reservoir a constant stream of pure solvent of the absorption liquid is supplied, the total quantity of discharged liquid to be analized being smaller than the overall supply but greater than the supply from the absorption member alone.

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3,977,255

## EVALUATING PRESSURE PROFILE OF MATERIAL FLOWING TO MOLD CAVITY

**Rodney J. Groleau, Plantsville, and Donald C. Paulson, Southington, both of Conn., assignors to Control Process, Incorporated, Plantsville, Conn.**

**Filed Aug. 18, 1975, Ser. No. 605,342**

**Int. Cl.² B29F *1/00***

**U.S. Cl. 73—432 R** **12 Claims**

**1.** A method operable for evaluating pressure profile of material flowing to a mold cavity and thereby determining the quality of a part being molded during a given cycle of operation of a molding machine while the given cycle of operation is in process comprising the steps of:

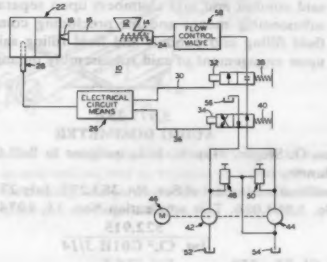
a. establishing the location of a first point comprising one end of a segment of the actual profile curve produced by the pressure of the material flowing to the mold cavity of the molding machine during the given cycle of operation thereof;

b. establishing the location of a second point comprising the other end of the segment of the actual profile curve produced by the pressure of the material flowing to the mold cavity of the molding machine during the given cycle of operation thereof;

c. determining the value of the slope of the segment of the actual profile curve defined by the location therealong of the first and second points;

d. providing the value of the slope of the corresponding segment of the theoretical profile curve produced by the pressure of the material flowing to the mold cavity of the molding machine when a part of acceptable quality is molded during a cycle of operation thereof; and

e. comparing the value of the slope of the segment of the actual profile curve to the value of the slope of the corresponding segment of the theoretical profile curve for purposes of detecting the existence of any significant difference therebetween indicative of the fact that the part being molded during the given cycle of operation of the molding machine is of unacceptable quality.

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3,977,256

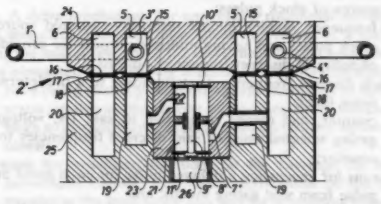
## ROTATIONAL ACCELERATION SENSOR AND METHOD

**Gunnar Wernstedt, Ljuskansv. 23, 13300 Saltsjobaden, Sweden**

**Filed Oct. 25, 1974, Ser. No. 518,166**

**Int. Cl.² G01P *15/02***

**U.S. Cl. 73—515** **25 Claims**



**1.** An arrangement for responding to rotational acceleration comprising:

a looped circuit for containing fluid under fluctuating pressures, said conduit having closed distal ends and being mounted for rotation about an axis,

separable first and second subassembly housing means for containing fluid under fluctuating pressures, one of said subassembly means being mounted at said rotational axis of said looped conduit and operatively communicating with said distal ends of said looped conduit for transmission of fluid pressure fluctuations therethrough, the other of said subassembly means defining therewithin first and second expansible chambers and including movable wall means for said expansible chambers mounted for movement upon expansion of the volume of one of said first and second chambers and simultaneous contraction of the volume of the other of said first and second chambers,

means for securing said first and second subassembly means in engagement one with the other, and

means for operatively communicating from each of said distal ends of said looped conduit through said one subassembly means and thence to fluid filling a corresponding one of said chambers within said other subassembly means fluctuations in relative fluid pressure at said distal ends of said looped conduit and including first and second diaphragm means mounted on respective ones of said subassembly means for precluding leakage of fluid from said conduit and said chambers upon separation of said subassembly means and for precluding commingling of fluid filling said conduit and fluid filling said chambers upon engagement of said subassembly means.

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**3,977,257**

**AUDIO DOSIMETER**

**James O. Steger, Muncie, Ind., assignor to Ball Corporation, Muncie, Ind.**

**Continuation-in-part of Ser. No. 383,292, July 27, 1973, Pat. No. 3,884,086. This application Nov. 11, 1974, Ser. No. 522,915**

**Int. Cl.² G01H 3/14**

**U.S. Cl. 73—558** **7 Claims**

1. An audio dosimeter comprising

means for sensing and converting sound to an electrical signal representing said sound;

weighted filter means for filtering said signal;

said filter having a frequency response which approximates the frequency response of the human ear;

means for generating a DC voltage having a magnitude that is proportional to the filtered output of said weighted filter;

a source of clock pulses;

a frequency divider means responsive to said source of clock pulses and having multiple outputs for providing a plurality of discreet frequency outputs;

each discreet frequency corresponding to a predetermined noise level;

a counter, and means responsive to said DC voltage for gating selected ones of said discreet frequencies to said counter;

means for generating a delayed pulse for each gated output pulse from said gating means; and

means responsive to said DC voltage for selectively gating said generated delayed pulses to said counter;

said selective gating means gating an increasing number of delayed pulses as said voltage increases from one predetermined voltage level to the next to thereby increase the count rate of said counter as said noise level increases between each of said preselected noise levels.

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**3,977,258**

**TRAVERSE MECHANISM**

**Gordon L. Bauer, c/o Wyrepak Industries, Inc., 136 James St., Bridgeport, Conn. 06604**

**Continuation of Ser. No. 420,217, Nov. 29, 1973, abandoned. This application Jan. 27, 1975, Ser. No. 544,598**

**Int. Cl.² F16H 21/16**

**U.S. Cl. 74—25** **23 Claims**

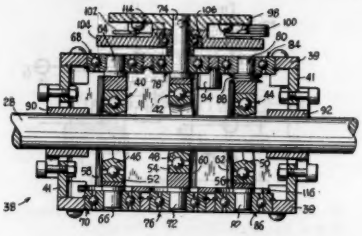
1. A reversing traverse mechanism for engagement with a rotating shaft, comprising in combination:

a. a base,

b. a roller,

c. means mounting the roller on the base for turning movement about its axis and for swiveling movement about another axis, and

d. operating means for automatically instantaneously swiveling the roller from one extreme angular position to an opposite extreme angular position in response to traversing movement of said base and roller along the shaft, said operating means including yieldable means comprising a



metal spring for biasing said roller to either of said two oppositely-disposed extreme angular positions and including an arm connected with said roller mounting means and pivotally movable with the roller about said other axis, and a second arm pivotally mounted on the base for movement about said other axis, said spring being connected between said arms and tending to bias them from dead-center positions toward oppositely-disposed extreme rotary positions with respect to one another.

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**3,977,259**

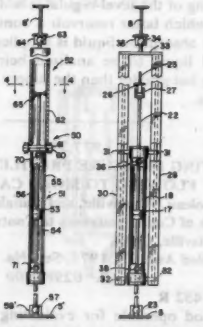
**PUMPING APPARATUS**

**Harold A. Goldfein, Lincolnwood, Ill., assignor to Inca Inks, Inc., Northbrook, Ill.**

**Filed Feb. 1, 1973, Ser. No. 328,544**

**Int. Cl.³ F16H 21/32**

**U.S. Cl. 74—41** **13 Claims**



1. In a hydraulically operated system for a well pumping apparatus wherein a counterbalanced walking beam having horseheads mounted on opposite ends with a polish rod operatively connected to one horsehead and counterweights connected to the other is pivotally mounted intermediate its opposite ends on a Samson post for rocking movement solely by the action of double-acting hydraulic cylinder means comprising, a piston which is stationary with respect to a generally vertically reciprocable cylinder housing said piston, upper and lower piston rods of equal size extending from said piston and projecting through the upper and lower ends respectively of

said reciprocable cylinder, and linkage means operatively interconnecting said reciprocable cylinder with said walking beam, the improvement comprising means for pivotally anchoring the lower end of said lower piston rod at a fixed pivot point so as to pivotally resist and absorb downward compression and upward tension on said lower piston rod, the upper end of said upper piston rod externally of said cylinder being unanchored with respect to absorbing either tension or compression forces or sidewise thrust.

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**3,977,260**

## MEANS FOR ADJUSTING THE MOVEMENT OF MOVING HEAD FANS

**Frank Leslie Winyard, Lower Templestow; James Graham, Eltham, and Edward Henry Brattstrom, Pascoe Vale South, all of Australia, assignors to Kemtron Properties Pty. Limited, Melbourne, Australia**

**Filed Feb. 19, 1975, Ser. No. 551,007**

**Claims priority, application Australia, Feb. 19, 1974, 6648/74**

**Int. Cl.² F16H *33/10***

**U.S. Cl. 74—86** **6 Claims**

1. In a device of the type including a motor driven rotary fan carried by a fan head pivotally disposed for gyrating movement about a first axis, the improvement which comprises a turntable rotatably driven by the fan motor and including a composite assembly rotatable about a second axis, said turntable assembly including a driven part having an adjustment member turnably mounted thereon for movement relative thereto about a third axis, means connecting said adjustment member to said fan head at a location spaced from said third axis, interconnecting means on said turntable assembly normally causing conjoint movement of said adjustment member and said driven part whereby energization of said motor causes said driven part and said adjustment member to normally rotate as a unit about said second axis and said fan head to gyrate through an angle which is a function of the radial distance from said second axis to said fan head connection point, manual means operable during rotation of said driven part to disconnect said interconnecting means causing said adjustment member to turn about said third axis relative to said driven part, whereby to adjust said connection point of said adjustment member and said fan head relative to said second axis and correspondingly the angle of gyration of said fan head.

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**3,977,261**

## WRAP-SPRING, VARIABLE SPEED DRIVE ARRANGEMENT

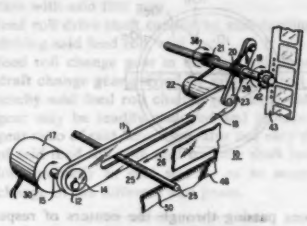
**Tuthill Saunders Doane, 373 School St., Westbury, L. I., N.Y. 11590**

**Filed Aug. 29, 1974, Ser. No. 501,474**

**Int. Cl.² F16H *27/02***

**U.S. Cl. 74—88** **2 Claims**

1. A speed control arrangement for varying the rotation imparted to an output shaft having means for driving movie film a first shaft of a power source, said arrangement comprising a lever arm having first and second ends, said first end being connected eccentrically to said first shaft in a manner to exhibit oscillations therein when said first shaft rotates, said output shaft being coupled to said second end by first and second springs wrapped about said output shaft, and a fulcrum adjustable along said lever arm for controlling the amplitude of oscillations in said second end, said first and second springs



being connected to said second end in a manner to convert oscillations in said second end to rotation of said output shaft; said means for driving comprising a sprocket wheel affixed to said output shaft for driving said film.

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**3,977,262**

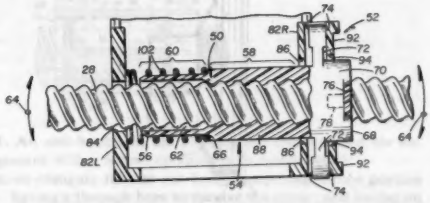
## DRIVE MECHANISM FOR A CARRIAGE

**John E. Randolph, Palatine, Ill., assignor to Teletype Corporation, Skokie, Ill.**

**Filed Jan. 15, 1975, Ser. No. 541,362**

**Int. Cl.² F16H *27/02***

**U.S. Cl. 74—89.15** **16 Claims**



1. A drive mechanism for converting rotational movement of a threaded lead screw into linear movement of a carriage along the lead screw's axis, the drive mechanism comprising:

an elongated body having a central bore therethrough, the bore being partially threaded complementarily to the lead screw, unthreaded portions of the bore being sufficiently large to permit the body to be skewed relative to the lead screw;

means for mounting the body to the carriage for linear movement thereof with linear movement of the body parallel to the lead screw axis and for permitting universal floating of the body at right angles to the lead screw axis; and

means for preventing rotary motion of the body about the axes of the lead screw and the bore.

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**3,977,263**

## INTERMITTENTLY ROTATING DRIVING DEVICES

**Shigetoshi Nara, 3-6-32, Kameido, Koto, Tokyo, Japan**

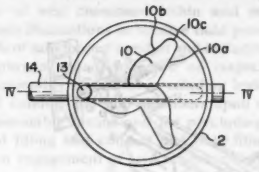
**Filed July 1, 1975, Ser. No. 592,266**

**Int. Cl.² F16H *27/02***

**U.S. Cl. 74—129** **2 Claims**

1. An intermittently rotating driving device comprising a cylindrical base, a cam disc rotatably supported by said cylindrical base and provided with a plurality of equally spaced radial cam grooves of an odd number, a slidable shaft extending through said cylindrical base in the diametrical direction thereof, and a pin secured to said slidable shaft for cooperating with said cam grooves, the outer end of each cam groove

being shaped to lock said pin, and the marginal lines between two sides of adjacent cam grooves being displaced from the




diametrical lines passing through the centers of respective outer ends of the cam grooves.

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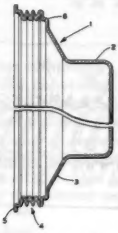
**3,977,264**

**METHOD OF MAKING POLY-V PULLEYS AND PRODUCT**

**Nolte V. Sproul, Canton, Ohio, assignor to Aspro, Incorporated, Westport, Conn.**

**Filed July 23, 1975, Ser. No. 598,340**
**Int. Cl.² F16H *55/44*; B21D *53/26***
**U.S. Cl. 74—230.8** **12 Claims**



1. A one-piece, sheet metal poly-V pulley formed from a cup-shaped blank having a hub wall, and an annular flange wall connected with the hub wall, the flange wall having an open end opposite that end connected with the hub wall; a series of relatively narrow, deep, outwardly opening V-shaped grooves formed in the blank flange wall adjacent said open end; the formed flange wall metal being configured to define relatively sharp crests and thickened groove valley walls, with groove side wall portions connecting the thickened valley walls and crests; and the metal in the groove crests, valleys and side wall portions of the formed flange wall being cold-worked and displaced to the configured shape from uniform thickness blank flange wall parent metal, and having roller spun groove side wall surfaces.

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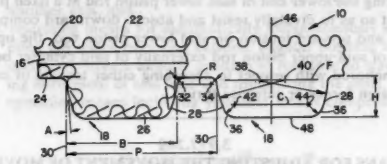
**3,977,265**

**POSITIVE DRIVE BELT SYSTEM**

**Wm. Spencer Worley, and John D. Redmond, Jr., both of Denver, Colo., assignors to The Gates Rubber Company, Denver, Colo.**

**Filed June 2, 1975, Ser. No. 583,069**
**Int. Cl.² F16G *1/28*, *5/16*, *1/22***
**U.S. Cl. 74—231 C** **14 Claims**

1. A power transmission belt comprising:
an endless tensile member; and
a plurality of elastomeric teeth secured to the tensile member and having oppositely facing curvilinear surfaces generally convergingly extending from the roots of a tooth at similar angles of 15° or less from a normal to the




tensile member, the curvilinear surfaces of a tooth extending into a generally flat tooth tip.

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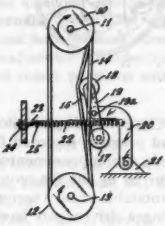
**3,977,266**

**MULTIPLE BELT TENSION CONTROL MECHANISM**

**Keith W. Tantlinger, Coronado, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.**

**Filed July 28, 1975, Ser. No. 599,670**
**Int. Cl.² F16H *7/12*, *7/10***
**U.S. Cl. 74—242.11 C** **7 Claims**



1. Mechanism for controlling the tension of the belts of a multiple V-belt drive comprising a first multiple V-groove drive pulley, a second multiple V-groove driven pulley, a plurality of V-belts, each of which is passed around and seated in respective grooves of both of said pulleys, said mechanism comprising:
a lever pivotally mounted to a support element adjacent said belts,
a walking beam pivotally connected to said lever by a fulcrum, said fulcrum being spaced from the pivotal mounting for the lever and located intermediately of the ends of the walking beam,
a pressure sheave axis adjacent each end of the walking beam, said axes being parallel and spaced at selected distances on opposite sides of the walking beam-to-lever fulcrum,
at least one pressure sheave journaled for rotation on each pressure sheave axis, the total number of pressure sheaves corresponding to the number of belts, said pressure sheaves being offset axially thereof by a distance equal to the lateral separation between adjacent belts, and positioned with one of the pressure sheaves in rolling relation with each of the belts,
the distance from the fulcrum to each pressure sheave axis being inversely proportional to, (a) the number of pressure sheaves journaled on the respective axes, and (b) the desired pressure ratio of the sheaves journaled on each pressure sheave axis, and
biasing means urging the lever in a direction, and with force of a magnitude, to exert selected, equal pressure of the pressure sheaves on their respective belts.

3,977,267

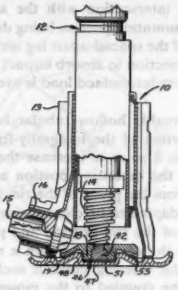
## POWDERED METAL GEAR FOR SCREW JACK

Richard S. Graafsma, Benton Harbor, Mich., assignor to Auto Specialties Manufacturing Company, St. Joseph, Mich.

Continuation-in-part of Ser. No. 464,362, April 26, 1974. This application Jan. 27, 1975, Ser. No. 544,384

Int. Cl.² F16H 1/12, 55/04

U.S. Cl. 74—416 8 Claims



1. A sintered powdered metal gear for use in a screw jack or the like, comprising a hub portion including an upper face and a lower face adapted to engage a support on the jack such as a thrust-bearing, and teeth of generally truncated tetrahedronal shape disposed around and radiating from the gear hub circumference, each tooth having gernerally radially extending crests being defined at least in part by radiating gear surface elements and in further part by spaced apart radiating recesses having radially extending hollow surfaces, the gear further including an undersurface having surface portions disposed generally parallel to each tooth-defining recess bottom surface to form, between the recess bottom surfaces and the gear undersurface, a radiating portion of the gear which is substantially uniform in material thickness.

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3,977,268

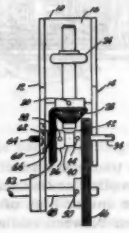
## FEED ROLL DRIVE

William B. Seabrook, 1141 Woodvale Ave., Gastonia, N.C. 28052

Filed Apr. 4, 1975, Ser. No. 565,063

Int. Cl.² F16H 1/14, 35/06; D01G 15/40

U.S. Cl. 74—417 3 Claims



1. Drive apparatus for driving a feed roll on a carding machine and the like comprising:

a bracket carried by said carding machine having at least one vertical side member,

an elongated longitudinal slot formed in said vertical side member of said bracket,

a transfer shaft having one end carried in said slot extended substantially perpendicular from said vertical side member and said slot, said one end being movable in said slot for adjusting the position of said transfer shaft along the length of said slot;

a first gear carried on said transfer shaft,

means for driving said first gear,

a draft change gear carried on said transfer shaft for rotation with said first gear,

a feed roll drive shaft carried by said carding machine for driving said feed roll, and

a feed roll change gear in meshing relationship with said draft change gear carried by said feed roll drive shaft,

whereby said feed roll change gear and said draft change gear may be readily removed and replaced to alter the gear ratio of said drive apparatus and vary the drive speed of said feed roll with said transfer shaft being adjustable longitudinally in said slot so as to accommodate the change of the different size gears.

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3,977,269

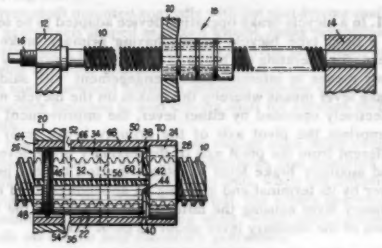
## ANTI-BACKLASH, SELF-ALIGNING NUT

Francis M. Linley, Jr., Easton, Conn., assignor to Universal Thread Grinding Company, Fairfield, Conn.

Filed May 5, 1975, Ser. No. 574,562

Int. Cl.² F16H 55/18

U.S. Cl. 74—441 23 Claims



1. An anti-backlash, self-aligning nut construction for engagement with a screw, comprising in combination:

a. an elongate tubular nut body comprising a base portion having a through bore to receive the screw, and having an internally threaded portion aligned with the base portion,

b. said threaded portion being elongate and having multiple longitudinal slots which divide it into multiple elements,

c. each of said elements having internal thread formations adapted for engagement with the threads of the screw,

d. said body having a pair of oppositely-disposed, transverse slots adjoining said longitudinal slots and enabling the elements to have limited movement toward and away from one another, thereby to enable the thread formations thereof to intimately engage the screw without clearance and looseness,

e. yieldable means carried by the elements, biasing the same in directions toward each other so as to maintain said lack of clearance and looseness,

f. an elongate spring sleeve surrounding and concentric with said nut body,

g. means rigidly connecting a portion of said sleeve to the base portion of the nut body,

h. said sleeve having solely three pairs of oppositely-disposed transverse slots, said pairs being spaced apart from one another along the length of the sleeve,

i. one of said slot pairs being adjacent to the transverse slots of the body and being circumferentially indexed by substantially 90° with respect to said transverse slots,

j. a second one of said slot pairs being circumferentially indexed by substantially 90° with respect to the third one of said slot pairs and being aligned with said one slot pair,

k. said three slot pairs dividing the sleeve into four parts, each part being capable of limited pivoting movement with respect to an adjacent part.

3,977,270

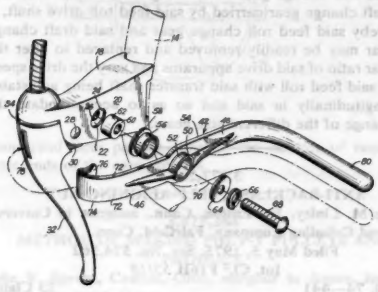
## BRAKE LEVERS FOR BICYCLES

Martin Cristie, Brooklyn, N.Y., assignor to Stelber Industries Inc., Medford, N.Y.

Continuation of Ser. No. 364,232, May 29, 1973, Pat. No. 3,861,234. This application Dec. 10, 1974, Ser. No. 531,238

Int. Cl.² G05G 11/00; B62K 23/06; B62L 3/02

U.S. Cl. 74—480 R 5 Claims



1. In a bicycle brake operating device adapted to be secured to a drop type bicycle handle having primary brake lever means for operating the brake of a bicycle, and auxiliary brake lever means in interconnecting engagement with said main brake lever means whereby the brakes on the bicycle may be effectively operated by either lever, the improvement which comprises the pivot axis of the primary brake lever being different from the pivot axis of the auxiliary brake lever, and said auxiliary brake lever is interconnected to said primary lever by its terminal end gripping an appendage fixed to said primary lever causing the latter's movement with the movement of the auxiliary lever about its pivot axis.

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3,977,271

## STEERING WHEEL

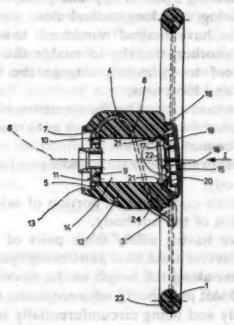
Burkhardt Becker, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Nov. 26, 1974, Ser. No. 527,343

Claims priority, application Germany, Nov. 30, 1973, 2359698

Int. Cl.² B62D 1/04

U.S. Cl. 74—552 5 Claims



1. A steering wheel for mounting on an end of a steering column comprising:

a. a one-piece integrally-formed member including a rim portion, at least one spoke portion continuing inward from the rim portion, and a mounting portion spaced from a plane defined by the rim portion, the mounting portion having two spaced-apart leg sections and a section connecting together an end of one leg section to a corresponding end of the other leg section so that the mounting portion has a U or V shaped configuration in cross-section, the one leg section continuing at its other end into the at least one spoke portion and the other leg section being adapted to be coupled to the end of the steering column to mount the steering wheel on the steering column, the one leg section defining a hole in the region of its intersection with the axis of the steering column, the mounting portion being deformable such that at least one of the spaced-apart leg sections moves toward the other leg section to absorb impact energy when a load exceeding a predetermined load is exerted on the mounting portion,

b. and a deformable hollow tubular body which has the mounting portion of the integrally-formed member embedded within it so as to increase the energy absorption capability of the mounting portion and which body extends away from the plane of the rim portion, the tubular body being adapted to be closed at an end thereof closer to the plane of the rim portion and provided at another end opposite the closed end with a recess for receiving the end of the steering column such that the steering column can be coupled to the mounting portion of the integrally-formed member, the hole in the one leg section being at least partially coextensive with a central space defined by the hollow tubular body.

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3,977,272

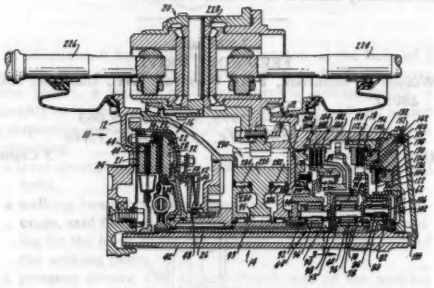
## TRANSMISSION MECHANISM

Guenter J. Neumann, Sterling Heights, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 5, 1975, Ser. No. 574,483

Int. Cl.² F16H 57/10, 37/08

U.S. Cl. 74—759 5 Claims



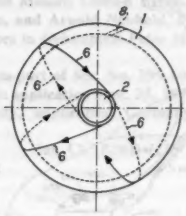
1. An automotive transmission including a pair of engageable input clutches, a planetary mechanism adapted to receive a driving input from one or both of said clutches when engaged, an output gear between said clutches and said planetary mechanism, said output gear connected to be driven by said planetary mechanism, said planetary mechanism being comprised of three planetary gear sets with at least one brake mechanism for each of said planetary gear sets and radially disposed with respect to its gear set, at least two of said brake mechanisms including torque transmitting members connecting the brake member to the planetary gear sets, said torque transmitting members being of cup-shape and assembled in nesting arrangement with respect to one another, whereby said brake mechanisms are located wholly within the axial dimensions of the planetary mechanism.

3,977,273

## FLYWHEEL

Adolphe O. G. Ernst, Lege; Pierre J. E. Lamicq, Bruges, and Jean A. Peisino, Blanquefort, all of France, assignors to Societe Europeene de Propulsion, Puteaux, France

Filed Sept. 5, 1974, Ser. No. 503,416
Claims priority, application France, Sept. 4, 1973, 73.32544
Int. Cl.² F16C 15/00
U.S. Cl. 74—572 11 Claims




1. An inertia flywheel comprising a rim having an axis of symmetry and a sheet formed of at least one filament, said sheet enveloping at least partially the outer surface of said rim in direct contact therewith and extending from said outer surface toward adjacent said axis on each side of said rim, the runs of filament forming each part of the sheet extending from said outer surface of the rim toward adjacent said axis being directed from adjacent said axis substantially radially toward said rim and intersecting adjacent said axis between said axis and said rim.

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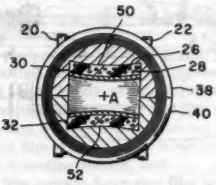
3,977,274

## TENSION-TORSION TIE BAR

Richard J. Ditlinger, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Sept. 26, 1975, Ser. No. 616,977
Int. Cl.² G05G 1/00
U.S. Cl. 74—579 R 6 Claims



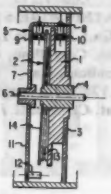

1. A tension-torsion tie bar comprising:
a pair of spaced-apart bushings;
an endless belt encircling said pair of bushings and including a plurality of windings of filament material arranged in spaced-apart parallel order and encased in an adhesive material;
clamp means surrounding said belt intermediate said spaced-apart bushing and provided with opposing oppositely curved convex surfaces for urging opposite side portions of said belt together to establish a predetermined fixed spaced-apart relationship thereof;
said opposing convex surfaces bearing against said opposite side portions of said belt to cause said side portions to bend transversely thereby reducing the deflection of the edge filaments relative to the deflection of the center filaments.

3,977,275

## GEAR MECHANISM FOR TRANSMISSION OF SMALL FORCES

Lothar Kiesewetter, and Walter Schweizer, both of Berlin, Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Germany

Filed Oct. 4, 1974, Ser. No. 512,096
Claims priority, application Germany, Oct. 17, 1973, 2352016
Int. Cl.² F16H 1/28; G04B 19/02
U.S. Cl. 74—800 9 Claims




1. A gear mechanism for transmission of small forces, such as a hand-mechanism gear for clocks or watches comprising:
a driving shaft;
a driven shaft mounted coaxially with the said driving shaft;
two gearwheels shaped as crown wheels, being respectively a stationary gearwheel and rotary driven gearwheel, and being mounted coaxially to each other;
each said gearwheel having a different number of teeth;
a coupling fastened to said driving shaft for rotation therewith;
said two gearwheels mounted to engage each other over a small portion of their circumferences and mounted in relation to the said coupling so that, when the coupling rotates with the said driving shaft, the rotary gearwheel mounted on the said driven shaft, while itself rotating, rolls off on the said stationary gearwheel,
said rotary gearwheel being a thin, elastically deformable disc with a multiplicity of axially bendably resilient radial spring fingers, each said finger extending at its free ends into a pin.
said coupling comprising an arm with an angular arm end extending in a radial direction beyond the circumferential area of the gear wheels and two coupling elements mounted on the arm end, each element contacting one of the gear wheels to bring about the mutual engagement of the two gear wheels.

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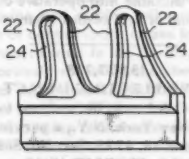
3,977,276

## METHOD FOR PRODUCING A FORMING TOOL HAVING A SINTERED WEB-LIKE CUTTING EDGE

Nobuyuki Osumi, Hamamatsu, Japan, assignor to Orion Tool Co., Ltd., Japan

Filed May 7, 1975, Ser. No. 575,209
Claims priority, application Japan, Aug. 27, 1974, 49-98231
Int. Cl.² B21K 11/00
U.S. Cl. 76—104 R 2 Claims




1. A method for producing a forming tool having a sintered web-like cutting edge comprising the steps of preparing a metal mount having a sintered member support portion of

predetermined shape, fixedly attaching with the application of heat a sintered member having an area substantially greater than that of said support portion to the support portion, said greater area of said sintered member providing an increased heat capacity during the attaching step shaping said sintered member along the contour of the support portion, and edging said sintered member along a predetermined edge portion of the sintered member to provide a cutting edge on the sintered member.

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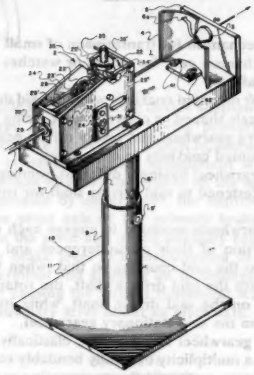
**3,977,277**

## INSULATED WIRE STRIPPER

**Irv Baston, Bremen, Ga.; J. Orbie Lowery, Ranburne, Ala., and O. Leon Thomas, Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.**

**Filed Jan. 12, 1976, Ser. No. 648,083**
**Int. Cl.² H02G 1/12**
**U.S. Cl. 81—9.51** **12 Claims**



1. A device for use in removing the insulation from an inner electrically conductive wire with an outer insulating covering thereon comprising:

-a rotary cutter having at least two juxtaposed cutting blades mounted on a common axis of rotation;

-support means for said rotary cutter, said blades being adjustable on said support means in their lateral position in the axial direction; and

-holding means for holding the insulated wire in a stable lateral position with respect to said rotary cutter, one of said blades of said rotary cutter being positioned in the center of said holding means but separated therefrom by a distance substantially equal to but less than the diameter of the inner conductive wire, said one of said blades serving to cut the insulating covering on the wire in a longitudinal direction along the wire as the wire moves through said holding means between said one of said blades and said holding means, the other of said blades being laterally shiftable into operative cutting position in place of said one of said blades when so desired.

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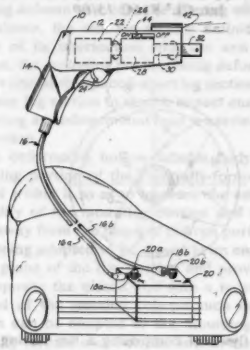
**3,977,278**

## AUTOMOTIVE ELECTRIC IMPACT WRENCH

**John Van Jackson, Oak Lawn, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed June 18, 1975, Ser. No. 588,037**
**Int. Cl.² B25B 17/00**
**U.S. Cl. 81—57.11** **1 Claim**

1. A power tool apparatus adapted to receive a socket tool for working on an automobile comprising, a housing for said power tool, a motor within said housing, means drivingly connected to said motor for carrying said socket tool, a light on said housing to facilitate night work on said automobile, two-conductor cable means emanating from said housing for supplying electrical power to said motor and said light, a free end of said cable means having electrical connector means



configured to simultaneously engage the two terminals of an auto battery, first switch means on said housing electrically interposed between said cable means and said motor and second switch means on said housing electrically interposed between said cable means and said light.

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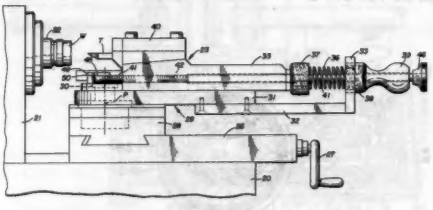
**3,977,279**

## LATHE FOR GENERATING SPHERICAL OR ASPHERICAL SURFACES ON WORKPIECES

**Derrell C. Hooker, Lancaster, Ohio, assignor to Derrell C. Hooker; James Maxwell, Jr. and Donald S. Dill, all of Lancaster, Ohio, part interest to each**

**Filed Apr. 16, 1975, Ser. No. 568,718**
**Int. Cl.² B23B 3/28, 5/40**
**U.S. Cl. 82—14 R** **18 Claims**



1. A machine for generating a surface on a workpiece comprising a spindle support unit for supporting the workpiece member for rotation about its axis, a tool-support unit for supporting a tool member in cooperation with the face of the workpiece, one of said units including a support for supporting one of the members for swinging movement about a pivot located along the spindle axis, so that the tool member will swing across the face of the workpiece member to generate a surface thereon, said support for the one member including floating means carried thereon for floating movement relative to said pivot so that the member carried thereby is advanced or retracted relative to the pivot and the other member, yieldable biasing means acting on said floating means to cause the member carried thereby to movably advance relative to said pivot into contact with the other member, and a cam arrangement for controlling the floating movement of said floating means relative to said pivot in cooperation with said biasing means, said cam arrangement including a cam member and a cam follower member, one of said last named members being

supported in normally fixed position relative to the floating means and the other being carried by the floating means, said normally-fixed member being carried by a member adjustable relative to the pivot axis in a direction longitudinally relative to said spindle axis.

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**3,977,280**

## SEVERING METHOD AND APPARATUS FOR PHOTOGRAPHIC TRANSPARENCIES

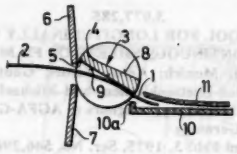
**Peter Hans Ernst Mundt; Otfried Urban, both of Garmisch-Partenkirchen, and Arnold Neubold, Farchant, all of Germany, assignors to Geimuplast Peter Mundt KG, Farchant, Germany**

**Continuation-in-part of Ser. No. 399,403, Sept. 21, 1973, abandoned. This application Sept. 25, 1974, Ser. No. 509,046**

**Claims priority, application Germany, Sept. 21, 1973, 7234661**

**Int. Cl.² B26D *1/38***

**U.S. Cl. 83—42** **6 Claims**




1. A method of positioning photographic film in a mounting means comprising the steps of:

pushing a photographic film strip having a leading end along a feed path to a cutting station located in said feed path;

providing said cutting station with severing means for severing said film strip into film segments each having a predetermined length;

pushing said film strip leading end through said cutting station, said film strip leading end being unsupported and maintained on said feed path solely by the stiffness of said film strip;

deflecting said film strip after said leading end has passed said cutting station;

continuing to push said deflected film strip with said leading end unsupported through said cutting station, said length being equal to the length of said segments;

pushing and continuously guiding said film strip to a mounting station, said leading edge remaining unsupported;

positioning said film segments in a mounting means located at said film mounting station; and

severing said film strip to form said film segments.

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**3,977,281**

## APPARATUS FOR PUNCHING HOLES

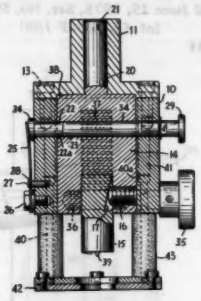
**Herbert H. Lewthwaite, 73 Buff Road, Tenafly, N.J. 07670**

**Filed Sept. 11, 1975, Ser. No. 612,588**

**Int. Cl.² B26D *7/16, 7/18***

**U.S. Cl. 83—138** **8 Claims**

1. In an apparatus for accurately locating and punching holes in stock comprising a punch support, a punch carried by the support and adjustable relative to the support from a punching position to a position for checking the position of the punch relative to the stock, a center point carried by the punch and movable with the punch into engagement with the stock to compare the center points of the punch and the stock before the punching operation to give the operator a visual indication of the location of the center point of the punch relative to the stock, and a telescoping connection between the punch and the punch support for maintaining them in




alignment when the punch is moved relative to the stock to bring the center point into engagement with the stock.

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**3,977,282**

## DEVICE FOR CUTTING ENVELOPE FOR A CIGARETTE BLOCK

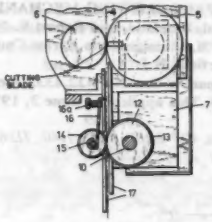
**Otto Niepmann, Gevelsberg, Germany, assignor to Maschinenfabrik Fr. Niepmann & Co., Gevelsberg, Germany**

**Division of Ser. No. 282,611, Aug. 21, 1972, Pat. No. 3,845,697. This application June 13, 1974, Ser. No. 479,251**

**Claims priority, application Germany, Dec. 28, 1971, 2164925**

**Int. Cl.² B26D *1/36;* B65H *5/06, 35/08***

**U.S. Cl. 83—156** **2 Claims**

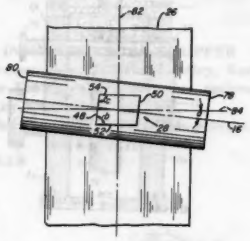



1. A device for feeding a foil blank of rectangular contour in a cigarette wrapping machine in an inclined position with regard to the feeding direction, which includes cutter roller means for receiving and cutting foil material to a desired length, two pairs of control roller means following said cutter roller means when looking in the feeding direction of said device for respectively receiving therebetween the cut foil leaving said cutter roller means, and driving means for driving said control roller means, the roller means of one pair of said control roller means being rotatable at a higher circumferential speed than the roller means of said other pair of control roller means whereby said cut foil is fed at an angle in said device said cutter roller means including cutting blades extending relative to the axis of rotation of said cutter roller means at an angle corresponding to the angle at which the cut foil is fed in said device.

## 3,977,283
## ROTARY PANEL CUTTER FOR CUTTING OPENINGS IN A WEB

Herbert W. Helm, Hollidaysburg, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.

Filed June 25, 1975, Ser. No. 590,160
Int. Cl.² B26F 1/00
U.S. Cl. 83—341 8 Claims



1. A rotary panel cutter for cutting openings in a web comprising,

a cutter die having a continuous upstanding knife blade with a pair of spaced side edge portions, a leading edge portion and a trailing edge portion,

said side edge portions positioned parallel to each other,

said leading edge portions positioned in spaced parallel relation to said trailing edge portion, said cutter die having a longitudinal axis parallel to said knife blade leading edge portion and trailing edge portion,

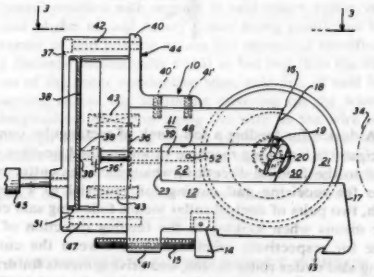
said leading edge portion and said trailing edge portion extending at oblique angles to said side edge portions, and

said cutter die leading edge and trailing edge portions arranged to be positioned perpendicular to the longitudinal axis of a web while cutting openings in the web.

## 3,977,284
## COMPACT SLITTING MECHANISM

Elvin A. Mastriani, Roseland, and Robert E. Mastriani, Long Valley, both of N.J., assignors to Arrow Converting Equipment, Inc., Fairfield, N.J.

Continuation-in-part of Ser. No. 422,433, Dec. 6, 1973, Pat. No. 3,921,488. This application June 3, 1975, Ser. No. 583,469
Int. Cl.² B26D 1/22, 1/40, 7/26
U.S. Cl. 83—495 16 Claims



1. In a mechanism, including a knife holding member for connection to a power source, for movement of the knife holding member, on actuation of the source, relative to a member to be contacted by the knife:

a. a knife casing having upper and lower arms having free ends disposed in spaced apart, parallel planar relation, said arms having elongated planar surfaces,

b. said knife holding member and knife casing arms being complementarily formed for interengaging, slidable axially aligned planar movement of the knife holding member relative to said arms of the casing, on actuation of said power source,

c. said knife and knife holding member having complementary means for rotatably and removably receiving said knife in the holding member,

d. said knife holding member means for so rotatably and removably receiving said knife including a slotted portion adjacent one end thereof,

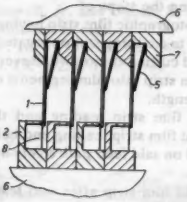
e. said knife holding member being of such length relative to the upper casing arm that said slotted portion will normally be substantially aligned with the free end of said upper casing arm when said knife holding member is disposed in the casing, to facilitate insertion of the knife into and its removal from said slotted portion of the holder and past said free end of said arm, in a continuous line, out of and into said slot,

f. and whereby the so positioned knife holder will be moved outwardly of said casing and into contacting engagement with the member to be so contacted by the knife, on actuation of the power source.

## 3,977,285
## CUTTING TOOL FOR LONGITUDINALLY CUTTING CONTINUOUS SHEETS OF FILM

Albert Perztsch, Munich; Anton Riedel, Gauting; Werner Wilke, Opladen-Luetzenkirchen, and Michael Mehltretter, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Feb. 3, 1975, Ser. No. 546,296
Claims priority, application Germany, Feb. 7, 1974, 2405849
Int. Cl.² B26D 1/24
U.S. Cl. 83—501 3 Claims



1. A cutting tool for cutting thin films into parallel strips, comprising a number of circular, rotatably mounted upper blade and a number of circular, rotatably mounted lower blade having a circular outer edge, the blades being rotatably mounted upon parallel axes, an annular recess in the side of each lower blade near its outer edge which leaves an annular cutting shoulder of substantial length which is almost the entire width of the lower blade extending from the side of the outer edge of the lower blade, the annular recess and cutting shoulder having joint outer and inner peripheries, the upper blades extending beyond the inner periphery of the cutting shoulders of the lower blades, spring means urging the upper blades resiliently against the lower blades, the material of which the upper blades are made being harder than the material of which the lower blades are made whereby the lower blade shoulders wear away by contact with the upper blades, the outer and inner peripheries of the cutting shoulders being disposed substantially parallel to the axes whereby the radial dimensions of the lower blades remain constant as the lower blades wear away, the upper blades being separated by spacer rings and being mounted on a upper shaft, the lower blades being mounted on a lower shaft with adjacent upper blades and lower blades in contact with each other, the upper blades

being relatively long and flexible, the spring means reacting between the upper shaft and a mid portion of the upper blades whereby a substantially constant cutting width is maintained between each pair of contacting upper and lower blades as the lower blades wear away, with the upper blades remaining on contact therewith almost across the entire width of the lower blades, the spring means comprises spring washers mounted on the upper shaft about the spacer rings, and each of the spring washers reacting between the spacer rings and the mid portion of the upper blades.

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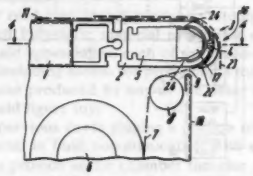
3,977,286

## CUTTING APPARATUS FOR LARGE-AREA MATERIAL IN SHEET FORM

Johannes Werner, In der Stroth, Germany, assignor to Meteor-Siegen Apparatebau Paul Schmeck GmbH, Frankfurt, Germany

Filed Apr. 16, 1975, Ser. No. 568,418
Claims priority, application Germany, Apr. 24, 1974, 2419689
Int. Cl.² B26D 1/10
U.S. Cl. 83—524 12 Claims



1. An improved cutting apparatus, comprising:
a. a processing table for receiving sheet material,
b. a groove in the processing table providing a guide path for a cutting apparatus,
c. a traction device for driving a cutting apparatus bi-directionally along the groove, and
d. a cutter head coupled to the traction device and comprising a cutter extending into the groove, a deflector positioned a selected distance from the processing table to permit such sheet of material to extend between the table and the deflector to the cutter, the deflector having a portion facing away from the table with an outer edge which portion extends obliquely towards the table for deflecting a further sheet of material from the cutter while such sheet of material is cut.

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3,977,287

## FABRIC CUTTING BLADE

Charles Beale, Belmont, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 22, 1975, Ser. No. 642,701
Int. Cl.² B26D 1/06
U.S. Cl. 83—697 3 Claims

1. A blade for cutting a multi-layer stack of fabric sheets comprising: a relatively flat elongated blade body having a leading edge and a trailing edge, the leading edge of the blade body having a knife edge for cutting through the multi-layer stack of fabric sheets as the blade is moved forwardly into the stack, a bevelled tip on the blade body for cutting through the fabric sheets as the blade makes a downstroke through the stack, said bevelled tip having a leading tip at the leading edge of the blade and a trailing tip at the trailing edge of the blade, the leading tip defining a rearward facing upwardly angled cutting edge which imparts a forward acting force on the blade to balance a rearward acting force imparted to the blade by the forward cutting movement of the leading edge through the stack, the trailing tip at the trailing edge of the blade defining

a forward facing upwardly angled cutting edge which trails the knife edge and is effective to sever trailing threads.

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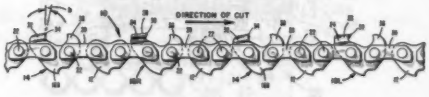
3,977,288

## SAW CHAIN WITH FREE END CHISEL RAKERS AND BIFURCATED CUTTERS

Lawrence Goldblatt, Hamilton; Werner Weiss, Burlington, and Vitomir Mance, Rockwood, all of Canada, assignors to Sabre Saw Chain Limited, Burlington, Canada

Filed May 21, 1975, Ser. No. 579,577
Int. Cl.² B27B 33/14
U.S. Cl. 83—833 12 Claims

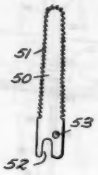



1. A saw chain for a chain saw comprising a series of center links and pairs of side links pivotally joined to form a chain; certain of said links bearing kerf sidewall cutting raker teeth having shank and toe portions; said toe portions having leading edges with positive cutting edge rake angles; said toe portions ending in kerf sidewall cutting, free end chisel corners; successive raker teeth along said chain being mirror images of each other; other of said links bearing paired, laterally opposed cutting elements forming bifurcated cutters; said free end chisel corners of said raker toe portions projecting laterally outwardly beyond said bifurcated cutter forming elements; the combined cutting width of two mirror image raker teeth being about 0.010 inches or more greater than the cutting width of said bifurcated cutters; the height of said bifurcated cutter forming elements lying in the range from generally equal to about 0.010 inches less than the height of said raker teeth.

## 3,977,289
## SAWS AND BLADES THEREFOR

Michael Anthony Tuke, Sutton, England, assignor to National Research Development Corporation, London, England

Division of Ser. No. 431,554, Jan. 7, 1974. This application Apr. 24, 1975, Ser. No. 571,397
Claims priority, application United Kingdom, Jan. 8, 1973, 1004/73; July 13, 1973, 33565/73
Int. Cl.² B27B *33/02*
U.S. Cl. 83—835 2 Claims




1. A saw blade of strip form having a plurality of teeth extending in a sequence at least along both side edges and one end edge thereof, said teeth each being of nonsymmetrical form raked in a common direction around the blade.

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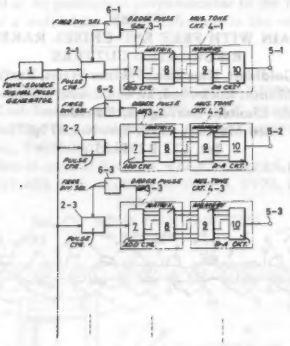
## 3,977,290
## ELECTRONIC MUSICAL INSTRUMENT

Noriji Sakashita, Hamamatsu, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Mar. 5, 1975, Ser. No. 555,620
Int. Cl.² G10H *1/00, 5/06*
U.S. Cl. 84—1.01 10 Claims

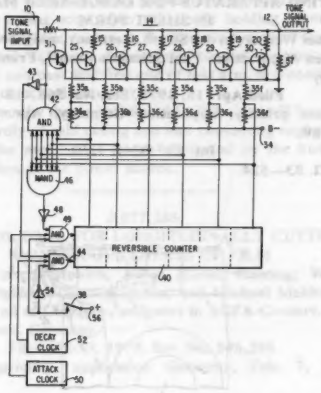


1. An electronic musical instrument comprising tone-source signal pulse generative means, a plurality of musical-tone generating means to generate respective musical tones, a plurality of pulse counting means coupled to said pulse generating means and adapted to generate output signals corresponding to respective of said tones, a plurality of order pulse generating means coupled between respective of said pulse counting means and said musical-tone generating means to control the latter to generate said musical tones, said pulse counting means having variable frequency-dividing ratios controlling the signals fed by the pulse counting means to the order pulse generating means, and a frequency-dividing ratio setting means coupled in feedback relation between said order pulse generating means and said pulse counting means to control the latter.

## 3,977,291
## ATTENUATOR NETWORK FOR MUSICAL INSTRUMENT KEYING SYSTEM

James S. Southard, Union, Mich., assignor to C. G. Conn, Ltd., Elkhart, Ind.

Filed Aug. 13, 1974, Ser. No. 496,943
Int. Cl.² G10H *1/02;* H01P *1/22*
U.S. Cl. 84—1.13 18 Claims




1. A tone-shaping attenuator network for use with an electronic musical instrument including in combination:

a signal input terminal adapted to receive tone input signals;

a signal output terminal from which output tone signals are obtained;

a voltage divider network including a plurality of resistors connected in series between said signal input terminal and said signal output terminal and further including a corresponding plurality of short-circuiting switches, each coupled in parallel with a different one of said plurality of resistors, each switch having a control electrode and rendered conductive and nonconductive in accordance with control voltages applied to such control electrode;

circuit means, the operative state of which changes in response to close pulses applied thereto, having a plurality of outputs connected to the respective control electrodes of different ones of said switch elements for controlling the conductivity of said switch elements in accordance with the operative state of said circuit means;

a key-operated control switch;

at least one clock pulse generating means for producing clock pulses;

first coincidence gate means having an output coupled to said circuit means for supplying clock pulses thereto and having at least first and second inputs coupled to said clock pulse generator and said key-operated switch means, respectively, for controlling the application of clock pulses to said circuit means in response to operation of said key-operated control switch;

means coupled with said circuit means and responsive to the outputs thereof for terminating changes in the operative state of said circuit means in response to a predetermined state of such outputs.

## 3,977,292
## FIGURE TOY HAVING TUNED SOUND PRODUCERS AND INDICIA

Riccardo Aldo Favilli, Redondo Beach; J. Stephen Lewis, Pacific Palisades, and Alfonso Fred Ratcliffe, Los Angeles, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Dec. 30, 1974, Ser. No. 537,293
Int. Cl.² G09B 15/00; A63H 5/00
U.S. Cl. 84—470 6 Claims

1. In a figure toy of the type having a body and appendages made from a soft, foamed Polymeric material, the improvement which comprises:

a plurality of reed-type sound producers mounted in said soft, foamed Polymeric material in at least one of said body and said appendages, each of said reed-type sound producers including means for producing a tone differing from the tone produced by any of the other sound producers in said figure toy;

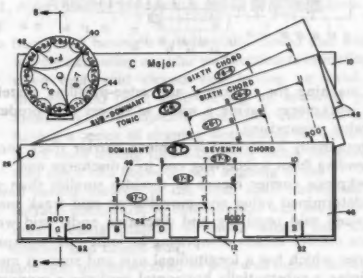
a flexible, impervious cover placing a portion of said Polymeric material in fluid communication with each sound producer to provide an air chamber therefor ; and

indicia means on said figure toy for identifying the sound produced by each sound producer, whereby said sound producers may be actuated in a predetermined sequence to produce intelligence.

## 3,977,293
## LEFT HAND CHORD LOCATOR

Verna M. Leonard, 8701 N. Highway 41, Fresno, Calif. 93710

Filed July 10, 1975, Ser. No. 594,747
Int. Cl.² G09B 15/02
U.S. Cl. 84—474 8 Claims




1. A bass chord and inversion teaching aid comprising:

a. a panel having the scale tones of a certain range of the chromatic scale named in a row along the lower edge thereof;

b. a plurality of individually exposable strips mounted on said panel and each representing a particular chord type named thereon;

c. each of said strips having indicator means thereon to register with all the named scale tones in said row which comprise the tones of the chord type named on the respective strip; and

d. each of said strips further including tabs foldable to selectively define openings to expose particular ones of said scale tones.

## 3,977,294
## COMPOSITE ARMOR AND METHOD

Paul F. Jahn, Chelmsford, Mass., assignor to Fiber Materials, Inc., Biddeford, Maine

Filed Sept. 7, 1971, Ser. No. 178,335
Int. Cl.² F41H 5/00
U.S. Cl. 89—36 A 17 Claims

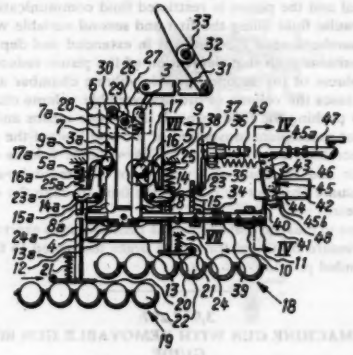
1. A composite laminate material comprising a plurality of layers of graphite sheet material each having adjacent at least one side thereof a layer of ceramic material having a density greater than about 50% of its theoretical density, said ceramic material constituting at least about 90% of the thickness of the composite laminate.

13. A method of preparing a composite laminate material of the type herein described constituting at least about 90% thickness ceramic, comprising the steps of (1) applying to at least one surface of a graphite sheet material a layer of ceramic material; (2) compacting said layer of ceramic material to at least about 50% theoretical density by hot rolling said ceramic material coated graphite sheet; and (3) laminating a plurality of compacted ceramic material-coated graphite sheets of suitable thickness to form the desired laminate.

## 3,977,295
## BELT MONITORING APPARATUS

Jacques Pier-Amory, Geneva, Switzerland, and Giosue Franci, Vimercate Milan, Italy, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Nov. 14, 1974, Ser. No. 523,911
Claims priority, application Switzerland, Nov. 20, 1973, 16329/73
Int. Cl.² F41D 11/00
U.S. Cl. 89—137 6 Claims




1. A belt monitoring apparatus for an automatic firing weapon supplied by a cartridge belt, comprising a feeler cooperating with a cartridge belt, a pivotable support element, said support element assuming a work position and a rest position, said firing weapon having a trigger, the trigger of the firing weapon being pivotable only in the work position of the support element into its actuation position and in which work position the support element is retained for such length of time as cartridges are located at the region of the feeler element, a lever system for manually rocking the support element out of its rest position into its work position, a lever having an end bearing at the support element, said lever being pivotably mounted via an intermediate lever at a stationary housing, one end of the intermediate lever being pivotably mounted at the housing through the agency of a first shaft which is operatively connected with the trigger, and the other end of the intermediate lever being pivotably connected via a second shaft with the

lever and that a second end of the aforesaid lever is connected with a trigger rod.

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3,977,296

## HYDRAULIC BUFFER ASSEMBLY FOR AUTOMATIC OR SEMIAUTOMATIC FIREARM

Stanley D. Silsby, Granby, and Henry J. Tatro, Westfield, both of Mass., assignors to Colt Industries Operating Corporation (Firearms Division), Hartford, Conn.

Filed Dec. 4, 1974, Ser. No. 529,394
Int. Cl.² F41D 11/12
U.S. Cl. 89—198 3 Claims

1. An improved semiautomatic or automatic firearm of the type having a receiver with a longitudinal chamber, a bolt and carrier assembly mounted in the chamber for reciprocating movement between recoil and battery positions, a buffer, having a cavity means, mounted in the chamber in contact with the bolt and carrier assembly for movement therewith, spring means to urge the buffer into contact with the bolt and carrier assembly for biasing the bolt and carrier assembly toward the battery position, and wherein the improvement comprises:

a piston mounted in the cavity means for reciprocating movement between extended and depressed positions, the piston being in contact with the bolt and carrier assembly;

a sliding seal movably mounted within the cavity means;

orifice means operatively interposed between the piston and the seal to establish first and second variable volume chambers in the cavity means respectively adjacent to the seal and the piston in restricted fluid communication;

hydraulic fluid filling the first and second variable volume chambers when the piston is in extended and depressed positions such that depression of the piston reduces the volume of the second variable volume chamber and increases the volume of the first variable volume chamber by pushing the fluid through the orifice means and such that subsequent movement of the seal toward the piston decreases the volume of the first variable volume chamber and increases the volume of the second variable volume chamber by pushing the fluid through the orifice means; and

means to bias the seal toward the piston so as to exert a fluid pressure on the piston which urges the piston to the extended position.

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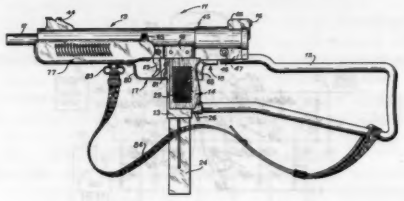
3,977,297

## SUBMACHINE GUN WITH REMOVABLE GUN BOLT GUIDE

Hector Mendoza Orozco, Adolfo Prieto 1709, Mexico City 12, Mexico

Division of Ser. No. 433,162, Jan. 14, 1974, Pat. No. 3,906,833. This application June 30, 1975, Ser. No. 591,566
Claims priority, application Mexico, Jan. 31, 1973, 141299
Int. Cl.² F41D 11/00
U.S. Cl. 89—199 2 Claims

1. A portable submachine gun comprising a support structure having upper and lower edges and front and rear ends; firing and safety means attached to said structure; a retaining device for a magazine attached to said support structure; a stock attached to said rear end of the support structure and to said magazine retaining device; a barrel attached to said support structure and having a cartridge receiving chamber at one end; a bolt slidingly mounted on said barrel and having guide means removably attached to the rear end of said support structure; and sight means included in said sliding bolt and in said guide means; in which: said sliding bolt comprises a tubular piece partially longitudinally cut in its lower edge and closed at one of its end by a solid support member; a window is provided adjacent to the solid support member and to the longitudinal cut and integrally including a slot in the portion thereof registering with the solid support member; a stop is interiorly included in the open end of said tubular piece; said guide means comprises a rail included in the lower edge of said solid support member; a helical spring interiorly coupled



in said tubular piece along same, which helical spring includes at one of its ends a bushing that registers with said stop of the open end of said tubular piece, said bushing having a diameter that occupies the clearance existing between the exterior diameter of said barrel and the interior diameter of said tubular piece; a guide removably attached to said support structure at its upper rear end portion; and coupling means for fixing said guide to said support structure; and said removable guide integrally includes runners having center openings.

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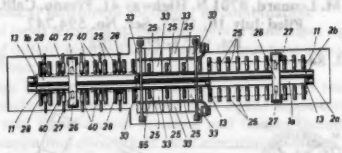
3,977,298

## MACHINE FOR TRIMMING AND EDGE-PROFILING PLATE-LIKE WORKPIECES

Ernst Linsinger, Steyrermuhl, Austria

Filed Jan. 31, 1975, Ser. No. 545,888
Claims priority, application Austria, Feb. 6, 1974, 912/74
Int. Cl.² B23C 3/12
U.S. Cl. 90—11 R 8 Claims



1. A machine for trimming and edge-profiling platelike metallic workpieces having a width in excess of a predetermined value, comprising

1. substantially horizontal workpiece carrier track means extending from a receiving end to a discharge end,
2. workpiece carrier means of a width smaller than said predetermined value and movable on said track means between said receiving and discharge ends, said workpiece carrier means comprising at least one workpiece carrier which has a longitudinal axis and support means defining a substantially horizontal workpiece-supporting plane, and fixing means for fixing the workpiece to said workpiece carrier on said support means,
3. supporting rollers disposed on both sides of said track means and rotatable on axes which are transverse to said track means and are spaced apart along said track means from said receiving end to said discharge end, said supporting rollers being disposed laterally outwardly of said workpiece carrier means and adapted partially to support a workpiece when said workpiece is fixed to said workpiece carrier,
4. milling means disposed on at least one side of said track means and comprising at least one milling unit which has

a milling cutter mounted for rotation on an axis which is substantially normal to said workpiece-supporting plane, and first guide roller means adapted to roll on the upper surface of a workpiece thus fixed to said workpiece carrier when the latter moves along said track means past said milling unit,

5. at least one carriage which is movable transversely to said track means, each milling unit being mounted on and connected to one of said carriages by a pivot,

6. a rocker lever which is pivoted to said carriage, the milling unit and the rocker lever being pivotal in a plane normal to the workpiece-supporting plane,

7. second guide roller means carried by said rocker lever and arranged to face the lower surface of a workpiece thus fixed to said workpiece carrier as the latter moves past said milling unit, and

8. force-exerting means operatively connected to said milling unit and said rocker lever and operable to force said first and second guide roller means against the upper and lower surfaces, respectively, of a workpiece thus fixed to said workpiece carrier.

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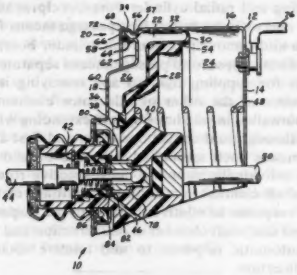
**3,977,299**

## FASTENING MEANS FOR CLOSING A SERVOMOTOR

**Delbert J. Gardner, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.**

**Filed Nov. 25, 1974, Ser. No. 526,484**
**Int. Cl.² F15B 9/10; F01B 19/00; F16J 3/02**
**U.S. Cl. 91—376 R** **1 Claim**



1. A servomotor for use in a power braking system comprising:

a front shell having a substantially closed end with a rearwardly extending annular wall section terminating with an open end, said closed end having an axial opening therein, said front shell having an inwardly projecting annular groove adjacent said open end, said front shell having a series of aligning slots along the open end, said front shell having tabs extending along the periphery of said open end between said aligning slots;

wall means located in the front shell having an external surface concentric to said annular wall section, said wall means being adapted to move within said front shell toward said closed end;

diaphragm means secured to said wall means having a rollable portion located between said external surface and the interior of the annular wall section and a bead on the end thereof concentric to and extending from said annular groove to said slots;

a rear shell having an end plate with a peripheral ledge substantially equal in width to the distance between the annular groove and the aligning slots in the annular wall, said peripheral ledge having a first section and a second section, said first section having a taper thereon with respect to said annular wall, said second section extending from said first section substantially parallel to said end plate, said second section having a series of lugs thereon for engagement with the aligning slots, said first section and said second section engaging said bead on the diaphragm means to radially compress the bead against said annular groove on said annular wall to establish a first chamber between the front shell and the diaphragm means and a second chamber between the diaphragm means and the rear shell upon said tabs on the annular shell being brought into engagement with said second section when said end plate is in substantially a radial line with said annular groove, said taper on said first section urging said bead toward said annular groove to create a sealing force, said sealing force being broken down into a radial component and an axial component to simultaneously urge the bead to resiliently flow against the annular wall and the annular groove to create an air tight seal, said first and second chambers being connected to a source of vacuum;

spring means located in the first chamber for urging the wall means into contact with said rear shell; and

control means responsive to an operator for interrupting the communication of vacuum to said second chamber and allowing air under pressure to enter therein to establish a pressure differential across the wall means, said pressure differential causing said wall means to move and transmit an output force through an output rod located in the axial opening in the front shell.

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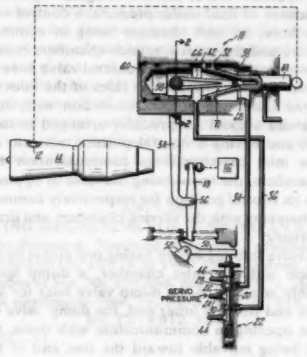
**3,977,300**

## ACTUATOR WITH FEEDBACK

**Robert Sherman, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Mar. 18, 1975, Ser. No. 559,459**
**Int. Cl.² F15B 9/10**
**U.S. Cl. 91—384** **5 Claims**




1. An actuator including a housing having a cylinder, a piston disposed in said cylinder, a bore formed internally within said piston defining a cam surface, feedback means including a follower operatively connected to said piston slidably mounted relative to said cam surface for producing a feedback signal indicative of the displacement of said piston and hydraulic means acting on said piston to displace it rectilinearly, said hydraulic means including a servo pilot valve and linkage means operatively connected to said servo pilot valve, said linkage means providing an input signal for causing hydraulic fluid to actuate said piston, said linkage means including a rotatably mounted shaft extending in said cylinder and being connected to said follower for rotary movement and a link connected to said shaft externally of said cylinder operatively connected to said servo pilot valve.

3,977,301

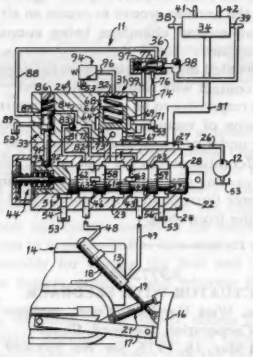
## LOW-EFFORT PROPORTIONAL CONTROL VALVE

Neil W. Kroth; Kenneth R. Lohbauer, and James E. Scheidt, all of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 463,561, April 24, 1974, Pat. No. 3,903,787, which is a division of Ser. No. 211,333, Dec. 23, 1971, Pat. No. 3,847,180. This application Jan. 31, 1975, Ser. No. 546,013

Int. Cl.² F15B 13/06

U.S. Cl. 91—412 11 Claims



1. A fluid control circuit for regulating operation of a double-acting hydraulic motor and including first hydraulic motor means, a source of fluid under pressure, a control valve body defining a bore, an inlet chamber being in communication with the bore and the source, service chambers being respectively in communication with the control valve bore in axially spaced apart relation on opposite sides of the inlet chamber, drain means also being in communication with the control valve bore and a spool reciprocably arranged in the control valve bore and having a neutral position wherein the spool blocks the inlet chamber from communication with both service chambers, the spool being movable in opposite directions from its neutral position for respectively communicating the inlet chambers with the service chambers and drain means and comprising:

a dump valve forming a bore having one end in free communication with the inlet chamber, a dump spool being movably arranged in the dump valve bore for separating its one end from its other end, the dump valve bore having an opening in communication with drain, the dump spool being movable toward the one end of the dump valve bore to block the inlet chamber from the drain opening and toward the other end of the dump valve bore to communicate the inlet chamber with the drain opening, spring means urging the dump spool toward the one end of the dump valve bore;

means forming passages for communicating the other end of the dump valve bore with the service chambers and with the drain;

regulating means being movable with the control valve spool and in regulating communication with the passages to communicate the other end of the dump valve bore with the respective service chambers when they are placed in communication with the inlet chamber by the control valve spool and to communicate the other end of the dump valve bore with the drain when the control valve spool is in its neutral position; and

second hydraulic motor means having an inlet passage in communication with the inlet chamber of the control valve, a bypass valve in responsive communication with the second motor means and normally providing communication for the passages from the service chambers with the other end of the dump valve bore, the bypass valve functioning in response to operation of the second motor means for directly communicating the other end of the dump valve bore with its one end, the dump valve then functioning as a pilot operated relief valve during operation of the second motor means.

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3,977,302

## FLUID MOTOR WITH RELEASABLE COUPLING

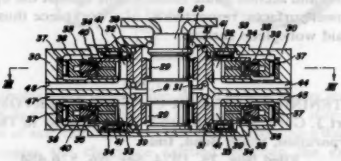
Karl Eickmann, Hayama, 2420 Isshiki, Kanagawa, Japan

Filed May 2, 1974, Ser. No. 466,245

Claims priority, application Austria, May 4, 1973, 3966/73

Int. Cl.² F01B 13/06; F16D 41/04; B64C 27/08; B64D 35/00

U.S. Cl. 91—492 6 Claims



1. A hydraulic radial-piston fluid motor, comprising a housing; two axially aligned annular rotor elements independently rotatably mounted in said housing and each having a central axial opening and radial cylinder bores; reciprocable pistons located in said cylinder bores; first passage means for supplying fluid to and removing it from the cylinder bores of one of said rotor elements; second passage means separate from said first means for suppling fluid to and removing it from the cylinder bores of the other of said rotor elements; a shaft element journalled in said housing and extending with annular clearance through said center openings; and first and second coupling means each associated with one of said rotor elements for individually coupling the respective rotor element with said shaft element in motion-transmitting relationship in automatic response to relative rotation of the respective rotor element and said shaft element in one direction and for uncoupling in automatic response to said relative rotation in an opposite direction.

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3,977,303

## ENGINES AND COMPRESSORS

Archibald John Stephen Baker, Childrey, near Wantage, England, assignor to Exxon Research and Engineering Company, Linden, N.J.

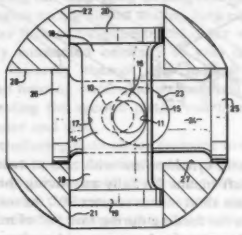
Continuation-in-part of Ser. No. 240,394, April 3, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 526,457

Int. Cl.² F01B 13/06; F16H 21/22; F02B 57/00

U.S. Cl. 91—493 17 Claims

1. A machine comprising a frame, a crankshaft rotatably mounted in the frame, a plurality of pairs of cylinders integral with the frame, the cylinders in each pair being disposed on opposite sides of the axis of the crankshaft and each pair of cylinders being angularly and axially separated around the crankshaft axis, means for allowing fluid to pass into each cylinder at one pressure and for allowing fluid to pass out of each cylinder at another pressure, the crankshaft having one crankpin for each plurality of pairs of cylinders, each crankpin having an axis which is eccentric relative to the crankshaft axis, a plurality of discs equal in number to the number of pairs of cylinders and each disc being rotatably mounted on each crankpin between the cylinders of a respective cylinder pair with its geometric axis having an eccentricity relative to the crankpin axis equal to the eccentricity of the crankpin axis relative to the crankshaft axis, the geometric axis of the discs on each crankpin having a relative angular separation which

is twice the relative angular separation of their respective cylinder pairs, adjacent discs being in contact with each other over areas bounded between their superimposed peripheries as viewed in directions parallel to the crankshaft axis and rigidly connected to each other within said areas whereby all the discs on a common crankpin rotate together, the periphery of each disc being adapted to take a bearing load, and each disc being received in a bearing aperture of a rigid yoke which extends perpendicularly to the crankshaft axis and symmetrically on both sides of the disc, there being in each cylinder a piston connected to each end of the yoke and the yoke being supported against side loads solely by cooperation of the piston with the cylinders at the ends of the yoke, the piston having a substantially fluid-tight seal with the respective cylin-



der and also includng a hard metal flexible bearing shim about the periphery of said piston and moving therewith, annular insert means engaging said piston disposed at opposite ends of said bearing shim to restrain axial movement of said shim on said piston, said bearing shim having an outside diameter larger than said piston and serving to act as essentailly the sole bearing member for adsorbing any side loads on the piston, by promoting the formation of a film of lubricant under pressure between the outer surface of the shim and the adjacent portion of the cylinder wall at relatively low piston speeds and forming said lubricant film to a wedge-shape (in axial cross section) with the wider end of the wedge facing the direction of movement of the piston at higher piston speeds, there being no gear or gear-train connection between any of the discs and any part of the frame or the crankshaft.

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**3,977,304**

## SPRING-LOADED BRAKE CYLINDER FOR A RAILWAY VEHICLE BRAKE

**Paul Willy Meissner, Munich, Germany, assignor to Knorr-Bremse GmbH, Munich, Germany**

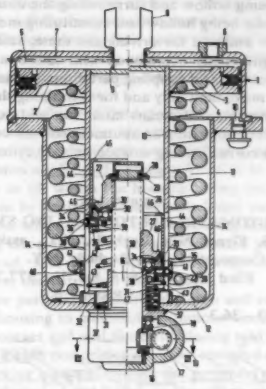
**Filed Sept. 5, 1974, Ser. No. 503,492**

**Claims priority, application Germany, Sept. 5, 1973, 2344691**

**Int. Cl.² F16J *1/00***

**U.S. Cl. 92—30** **9 Claims**

**1.** A spring-loaded brake cylinder for an air-brake system of a railway vehicle and having an auxiliary release device, comprising a cylinder having a piston therein and a first spring acting on one side of the piston to load the same in one direction and the other side of the piston being subjected to a pressure medium introduced into the cylinder, a first screw coupling comprising first and second coupling members, said first coupling member comprising a threaded shaft having a reversible thread thereon rotatably mounted within said cylinder and supported against axial displacement, said shaft having a first end, said second coupling member including a nut threaded upon said shaft, a compression spring acting upon said second coupling member, second coupling means for coupling said second coupling member to said spring loaded piston for retaining said second coupling member against rotation when the pressure acting against said piston is below a predetermined level, said second coupling means comprising an axially displaceable non-rotatable annular coupling element surrounding one of said first and second coupling members and having a coupling surface engageable with a corresponding coupling surface on the other of said first and second coupling members, a tubular member attached to said spring loaded piston, means for guiding non-rotatably said annular coupling element for axial displacement within said tubular member, an annular shoulder on said tubular member, said annular coupling element being disposed between said annular shoulder and one of said first and second coupling members, abutment means for limiting the axial displacement of said nut relative to said first end of said shaft in a direction



opposite to said one direction of loading of said first spring, upon abutting engagement of said second coupling member with said abutment means said piston can be displaced by the pressure medium a distance greater than the distance required for disengagement of said second coupling member from said spring-loaded piston, and spring biased means for locking said annular coupling element with respect to said piston upon abutting engagement of said second coupling member with said abutment means, and a third spring acting against said annular coupling element with a force less than the locking force of said spring biased locking means.

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**3,977,305**

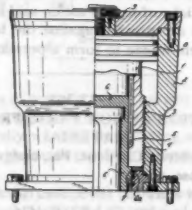
## OPERATING MECHANISM FOR TURNING AN AXLE END

**Jorgen Sondergaard, Naestved, Denmark, assignor to C.O. Hansen MASKINFABRIK af 1970 A/S, Naestved, Denmark**

**Continuation of Ser. No. 179,668, Sept. 13, 1971, abandoned. This application Nov. 21, 1973, Ser. No. 418,155**

**Int. Cl.² F01B *3/00***

**U.S. Cl. 92—31** **2 Claims**



**1.** An operating mechanism for swivelling an axle end such as that of a butterfly valve, and comprising a piston-cylinder-mechanism operated by a pressure medium, a piston member thereof being axially displaceable in the cylinder by the pressure medium, means directly connecting said piston member

with a coupling part for rotational movement therewith and for relative axial displacement with respect thereto, said means connecting said piston member and coupling part comprising axially extending teeth on said piston member engaging corresponding axially extending teeth on said coupling part whereby relative movement between said piston member and coupling parts is limited to axial movement, the piston member and the cylinder having mutually cooperating screw means that impart opposite rotational motions to the piston member when the latter is displaced in respective opposite axial directions, the coupling part projecting into the cylinder through a pressure medium tight sealing means, the piston member being hollow and surrounding the coupling part, the coupling part being hollow and constituting means for receiving an axle end and for driving the same, said screw means being longitudinally overlapped with said coupling part and means mounting said coupling part directly to said cylinder for rotational movement only and for restraining the same against axial movement, said means mounting said coupling part to said cylinder comprising an abutment surface on said coupling part and a corresponding surface on said cylinder.

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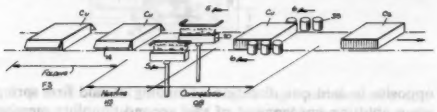
**3,977,306**

## AUTOMATIC CARTON SEALING SYSTEM

**Edward S. Flynn, New Rochelle, N.Y., assignor to Flynn Burner Corporation, New Rochelle, N.Y.**

**Filed May 15, 1975, Ser. No. 577,764**
**Int. Cl.² B31B 1/64**
**U.S. Cl. 93—36.3** **11 Claims**



1. In a system for sealing tubular cartons having at either end a pair of dust flaps, a lower major flap and an upper major flap, the dust flaps being folded in and the lower flap being folded over the dust flap, the upper edge of the lower flap being retained in the fold of the upper flap which is partially folded over the lower flap and extends outwardly therefrom to define an open-ended triangular shed, the interfacial surfaces of the major flaps having thermoplastic layers therein, the combination comprising:

A. a heating station including a pair of gas burners disposed in parallel relation and producing two rows of flames at positions corresponding to said sheds, each burner including a deck of corrugated metallic ribbons providing an array of jets through which gas escapes,

B. a compression station having means to press said upper major flaps against said lower major flaps, and

C. means to convey said cartons successively through said heating station and compression station, whereby said sheds pass over said burners and said flames impinge on the interfacial surfaces to soften said layers, and then the upper flaps are pressed against the lower flaps and the layers therein freeze to form a permanent bond.

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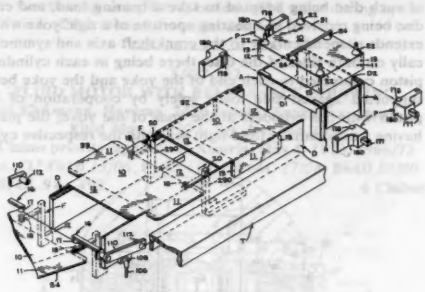
**3,977,307**

## FABRICATION OF BOX PARTS FROM PLASTIC MATERIAL

**Frederick D. Roberts, Chalfont, Pa., assignor to FMC Corporation, San Jose, Calif.**

**Filed Apr. 23, 1975, Ser. No. 570,903**
**Int. Cl.² B31B 1/26**
**U.S. Cl. 93—49 R** **8 Claims**

1. Apparatus for forming box parts from blanks which have main, side and end panels, said apparatus comprising laterally spaced longitudinal die sets for folding the end panels, longitudinally spaced transverse die sets in longitudinal alignment with said longitudinal die sets for folding the side panels, feed means including pusher means for feeding blanks from said longitudinal die sets to said transverse die sets, main shaft means operating said die sets for completing a box part during one revolution of said shaft means, and means for reciprocating said blank feed means operated by said main shaft means; the improvement comprising means for driving said reciprocating means in synchronism with and at twice the speed of said main shaft means for fully advancing the pusher means while said main shaft means rotates 90°, means for raising said pusher means for feeding during said 90° of main shaft means rotation, and means for lowering said pusher means to clear blanks at said longitudinal die sets during the remaining 270° of main shaft means rotation.



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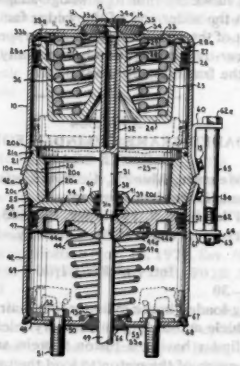
**3,977,308**

## DOUBLE PISTON BRAKE ACTUATOR

**Kenneth D. Swander, Jr., and Bruce D. Sibley, both of Lawrence, Kans., assignors to Aeroquip Corporation, Jackson, Mich.**

**Filed Mar. 18, 1974, Ser. No. 451,916**
**Int. Cl.² F01B 7/00**
**U.S. Cl. 92—63** **26 Claims**



1. Brake actuating mechanism comprising, in combination,

a closed housing having inner and outer end walls,

said walls inner and outer with respect to a vehicle brake mechanism,

a first piston within said housing adapted to reciprocate inwardly and outwardly therewithin,

means for introducing fluid under pressure to said housing adjacent the outer end wall thereof and to the outer side of said first piston,

a brake operating rod on the other, inner side of said first piston axially arranged relative thereto and rigidly connected centrally thereof at one end of said rod,

said rod projecting through the inner end wall of the housing for reciprocatory movements,
means attaching the other end of said brake operating rod to a pivoted slack adjuster whereby said rod moves in an arcuate path, thus requiring the said first piston to cant or articulate within the housing during reciprocation therewithin,
an auxiliary compartment at the outer end of said housing,
the outer end wall of said housing constituting the inner end wall of said compartment,
the inner end wall of the compartment having a central opening therethrough,
the outer end of said compartment closed by an outer wall member,
a second piston within said compartment with the outer face thereof facing the outer wall of said compartment,
coil compression spring means seating between said second piston outer face and compartment outer wall member,
a rod fixedly connected centrally to said second piston, extending inwardly thereof and having a sliding fit through the housing outer end wall central opening,
means air sealing the second piston rod through the said housing outer end wall,
means for introducing fluid under pressure to said compartment adjacent to the housing outer wall and inboard of the second piston for normally holding the second piston in the region of the compartment outer wall, thereby to hold said coil compression spring means under compression,
said fluid under pressure introduced into a second piston pressurization chamber between the second piston inner face and the housing wall outer face,
said first piston configured peripherally so as to be able to articulate or tilt within the housing during reciprocation therewithin by said first piston having a considerably lesser outer diameter than the inner diameter of said housing and a radially extending circumferential flange positioned peripherally therearound, said flange spaced inwardly on the first piston from the outer end thereof, and
means on the periphery of said piston and cooperating with the housing to maintain continuous circumferential bearing contact and seal therewith during reciprocation, said means comprising, in combination, a hollow-centered circumferential packing cup mounted on the periphery of the first piston outboard of the flange on the piston and opening toward the outer pressurized side of said piston, and a separate circumferential piston bearing removably fixed on the periphery of said circumferential flange on said piston, said packing cup resting on and backed by said piston bearing.

9. Brake actuating mechanism comprising
a closed housing having inner and outer end walls,
said housing having an inner portion and an outer portion,
a first piston having an inner end and an outer end slidably mounted within the outer portion of said housing adapted to reciprocate inwardly and outwardly therewithin.
means for introducing fluid under pressure to said housing adjacent the outer end wall and adjacent the outer end of said first piston,
a brake operating rod on the inner end of said first piston axially arranged relative thereto and rigidly connected centrally thereof at one end of said rod,
said rod projecting through the inner end wall of said housing for reciprocatory movements,
means attaching the other end of said brake operating rod to a pivoted slack adjuster, whereby said rod moves in an arcuate path, thus requiring the said first piston to cant or articulate within the housing during reciprocation therewithin,
coiled spring means bearing at one end against said inner end of said first piston for urging said rod and said piston in a direction toward the outer end wall of said housing,
stop means in said housing positioned intermediate the inner and outer end walls thereof,
a second piston slidably mounted within the inner end of the housing and having an inner side and an outer side,
a compression spring bearing at its outer end against said stop means and at its inner end against said second piston outer side for urging the latter toward the inner end wall of the housing,
said second piston including a sleeve extension fixedly attached thereto and defining together with said piston a bore through which said rod extends,
abutment means on said rod against which said piston sleeve extension abuts,
means air sealing said sleeve extension through the housing inner end wall for reciprocation therethrough,
and means for introducing fluid under pressure to the inner end portion of the housing adjacent the inner side of said second piston, for normally holding said piston in position toward said stop means,
whereby, upon failure of fluid pressure, said compression spring means abruptly actuates said second piston, thereby moving said operating rod for brake application,
said first piston configured peripherally so as to be able to articulate or tilt within the housing during reciprocation therewithin by having a considerably lesser outer diameter than the inner diameter of said housing and a radially extending circumferential flange positioned peripherally therearound, said flange spaced inwardly on the first piston from the outer end thereof, and
means on the periphery of said first piston and cooperating with the housing to maintain continuous circumferential bearing contact and seal therewith during said reciprocation, said means comprising a hollow-centered circumferential packing cup mounted on the periphery of the first piston outboard of the flange on the piston and opening toward the outer, pressurized side of said piston, and a circumferential separate piston bearing removably fixed on the periphery of the circumferential flange on the piston, said packing cup resting on and backed by said piston bearing.

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**3,977,309**

## OBSERVATION OF MOVING WEBS

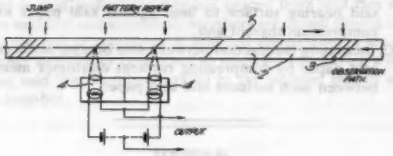
**Victor Henry Gilbert, Isleworth, England, assignor to Robinson & Sons Limited, Chesterfield, England**

**Filed Oct. 7, 1974, Ser. No. 512,603**

**Claims priority, application United Kingdom, Oct. 10, 1973, 47234/73**

**Int. Cl.² B31C 3/00**

**U.S. Cl. 93—94 R** **14 Claims**



7. In the process of manufacturing tubular container bodies bearing patterns in register with the ends thereof, comprising the steps of helically winding onto tubing a pattern strip or web bearing along its length regularly repeated complex variegated patterns,
utilizing two fixedly positioned photo-electric cells aligned a fixed distance apart in the direction of movement of the moving web for concurrently observing the web,
causing the photocells simultaneously to scan identical data at different locations along the moving web,
connecting the cells in an electrical circuit which is balanced when they observe identical data and which produces an output when they observe non-identical data,

providing non-identical data as a control feature in accordance with a predetermined arrangement,
said output being produced by only one of said cells observing a control feature,
and utilizing said output to initiate activating mechanism for controlling subsequent use of said patterns in the manufacturing process.

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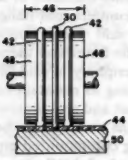
3,977,310

## METHOD OF SCORING FRACTURABLE ADHESIVE BACKING

Jerry L. Keck, Chicago, and James Robert Rowley, Calumet Park, both of Ill., assignors to Ludlow Corporation, Needham Heights, Mass.

Division of Ser. No. 169,653, Aug. 6, 1971, Pat. No. 3,719,548.
This application Nov. 27, 1972, Ser. No. 309,705
Int. Cl.² B26D 3/08
U.S. Cl. 93—58 ST 5 Claims




1. A process for selective embrittlement of a continuous path on a cellulosic paper comprising the steps of:
A. mechanically compressing the fibers thereof until the paper is less than about 50% of its original thickness, said embrittlement being achieved by supporting one surface of said paper on a support surface and moving said paper relative to a compressing tool having a blunt, rotating, scoring edge of a radius of at least about 0.02 inches and applied against the second surface of said paper, and wherein said paper is a paper at least 0.004 inches thick and said working edge contacts a side of said paper having a surface with a release coating thereon,
B. controlling said compression pressure by providing bearing surfaces on each side of said scoring edge, and causing said bearing surface to bear against said paper during compression thereof and,
C. increasing the traction between said bearing surfaces and said paper by compressing resilient elastomer members between such surfaces and said paper.

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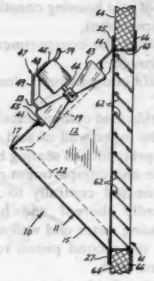
3,977,311

## LOUVER FAN ASSEMBLY

John V. Felter, 1309 Ashland, Houston, Tex. 77008

Filed Nov. 22, 1974, Ser. No. 526,122
Int. Cl.² F24F 13/06, 7/06
U.S. Cl. 98—39 9 Claims

1. Ventilation apparatus, comprising a housing having a fan mounting side facing the interior of said housing at a downward angle and having a vertical open side opposite said fan mounting side serving as an air outlet, connection means around said open side of said housing for use in connecting said open side of said housing to a wall having an air outlet therethrough surrounded by said connection means, said housing having a closed lower side extending from the lower edge of said fan mounting side angularly downwardly to the lower edge of said vertical open side, fan means supported at an opening through said fan mounting side of said housing



disposed to impel air into said housing and toward said open side of said housing.

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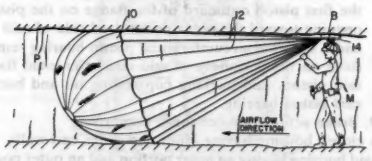
3,977,312

## PARACHUTE STOPPING FOR MINE VENTILATION USE

Fred N. Kissell, Pittsburgh, Pa., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 31, 1975, Ser. No. 627,811
Int. Cl.² E21F 17/00, 1/14
U.S. Cl. 98—50 7 Claims




1. A mine stopping for controlling air ventilation in a mine passage, said stopping comprising a parachute-type substantially air impermeable canopy, constructed of an air impermeable material, for, when erected, blocking the mine passage in which the canopy is located, a plurality of lines secured at one end thereof at spaced locations near the peripheral edge of the canopy, and means, connected to said lines at the other ends thereof, for securing said lines to a fixed point within the passage in which the canopy is located.

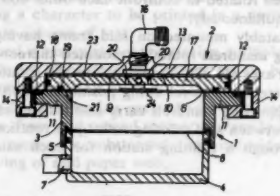
7. A method of stopping a mine passage to control mine ventilation using a parachute-type stopping comprising a substantially air impermeable parachute canopy and a plurality of lines connected thereto, said method comprising arranging the parachute canopy underside faces in the direction of the airflow in the passage, securing the ends of the lines connected to the parachute canopy to a fixed point on the passage wall, and raising the parachute canopy when the canopy is filled by the air flow and is erected in place thereby.

3,977,313

## BREWING CONTAINER FOR A BEVERAGE BREWING MACHINE

Karl Bieri, Zurich, Switzerland, assignor to Hagezet-Aktiengesellschaft, Zurich, Switzerland

Filed Oct. 1, 1975, Ser. No. 618,384
Claims priority, application Switzerland, Oct. 2, 1974, 13269/74
Int. Cl.² A47J 31/00
U.S. Cl. 99—297 3 Claims



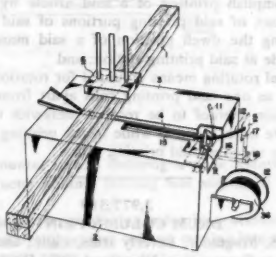
1. A brewing container for a beverage-brewing machine, said container comprising a body and a head, said head being provided with a hot-water inlet pipe and being slidably disposed on said body, further comprising sealing means and an axially-movable sealing piston having a top side and an underside respectively comprising differently-sized surfaces adapted to be impinged upon said hot water, said sealing means being disposed on the side of said piston comprising the smaller of said surfaces for cooperation with other portions of said container.

3,977,314

## TYING DEVICE

Masashi Tanaka, Shizuoka, Japan, assignor to Fuji Jidoki Kabushiki Kaisha, Japan

Filed May 23, 1974, Ser. No. 472,526
Claims priority, application Japan, May 24, 1973, 48-57192
Int. Cl.² B65B 13/04
U.S. Cl. 100—4 4 Claims



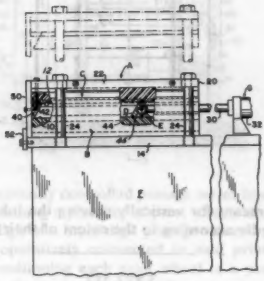
1. A device for tying an object with tape comprising a stand for mounting an object to be tied, a slot in the stand for feeding tying tape, means for supplying tape to the slot, detector means disposed beyond the forward end of the slot for detecting the end of the tape, an arm pivotally mounted at one end thereof to the stand for movement within the slot, a grip mechanism at the other end of the arm constructed and arranged to grip the end of the tying tape when it is detected by the detector means, a pivotal connection in the arm between the ends thereof, means for moving the arm about its pivotal mounting and the pivotal connection to bring the end of the tape held by the grip mechanism over the object to be tied to the underside of the object and in overlapping relationship with a portion of the tape on the underside of the object, means for binding the overlapped portion of the tying tape, and means for cutting the tape adjacent the upstream end of the binding.

3,977,315

## FOOD PRESS AND DIES

Louis A. Bettcher, Amherst, Ohio, assignor to Bettcher Industries, Inc., Birmingham, Ohio

Filed Feb. 24, 1975, Ser. No. 552,308
Int. Cl.² B30B 7/04
U.S. Cl. 100—232 1 Claim



1. In a press for shaping comestible products, such as meat or the like having a stationary die support, a first die member connected to said stationary support and having in one side thereof an elongated cavity of uniform cross-sectional shape open at one end, a movable die support, a second die member connected to said movable die support and having a second elongated cavity of uniform cross-sectional shape in the side thereof opposite to said one side of said first die member, mechanism for moving said movable die support to and from a position adjacent to said stationary die support to close said die members and cause said cavities in said die members to form a tubular aperture of uniform cross-sectional shape, a ram in the end of said cavity in said first die member and conforming to the cross-sectional shape of said aperture formed by said first and second die members when closed, and mechanism for reciprocating said ram: a first member detachably connected to said second die member having a side inclined to the length of said aperture closing the end of the cavity in said second die member spaced from said ram and when said first and second die members are closed closing said open one end of said cavity in said first die member; a second member detachably connected to said ram and having a side facing said first member parallel to the inclined side of said first member.

3,977,316

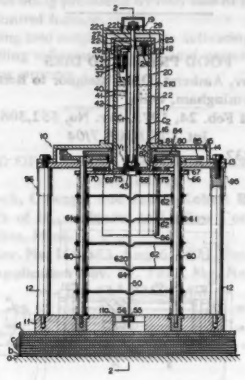
## TUBULAR NEEDLE-DRIVING DEVICE OF A FABRIC-MARKING APPARATUS

Ichiro Okada, 7-1, 1-chome, Ookayama, Megura, Tokyo, Japan

Filed Oct. 3, 1975, Ser. No. 619,230
Claims priority, application Japan, Oct. 8, 1974, 49-115936
Int. Cl.² B44B 5/00
U.S. Cl. 101—26 4 Claims

1. A tubular needle-driving device of a fabric-marking apparatus having a frame, a cylindrical ink tank vertically supported on the frame filled with marking ink, a tubular needle coaxially fitted to the lower part of the ink tank in a vertical position, and an ink pump received in the ink tank so as to discharge the marking ink stored in the tank, as need arises,

to the tubular needle, which further comprises drive means for rotating the ink tank and tubular needle about the same axis;



and screw means for vertically moving the ink tank and the tubular needle according to the extent of their rotation.

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**3,977,317**

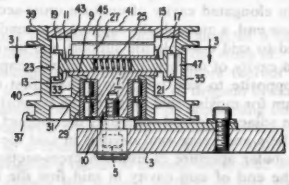
**PRINTING WHEEL**

**Patrick Delligatti, c/o Dalemark Industries, 950 Airport Road, Lakewood Industrial Park, Lakewood, N.J. 08701**

**Filed June 20, 1975, Ser. No. 588,765**

**Int. Cl.[2] B41F** *17/00, 13/10*

**U.S. Cl. 101—35** **4 Claims**



1. A printing wheel comprising a stationary spindle assembly, said assembly including a vertical hub having a flat, disc-shaped upper surface; a first magnetic means including a first magnetic pole piece carried on said upper surface; a rotatable type carrier mounted on said hub, said type carrier being in the form of a cylinder and having an open top end; cover means closing the open top end of said type carrier; a second magnetic means carried by said cover means and positioned adjacent said first mentioned magnetic means whereby said cylindrical type carrier is biased to a null position after any rotation of the type carrier relative to said spindle assembly.

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**3,977,318**

**MACHINE FOR SIMULTANEOUS TWO IMAGE FLEXOGRAPHIC PRINTING**

**Alvin M. Cohan, c/o American Production Machine Co., 3333 Park Ave., Union City, N.J. 07087**

**Filed Aug. 14, 1974, Ser. No. 497,423**

**Int. Cl.[2] B41F** *17/28*

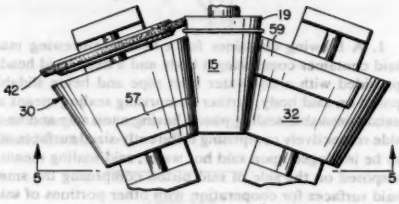
**U.S. Cl. 101—38 A** **8 Claims**

1. A machine for simultaneously applying two registered images to the frustoconical or cylindrical outer wall surface of a hollow article comprising

a frame;

two printing heads mounted on said frame, each said printing head having a printing roll, said two printing rolls being rotatably mounted with their axes in a common plane and being in predetermined spaced relation in accordance with the article size to define a passage therebetween for a said article, and each said printing roll having a raised image forming printing portion and a non-printing portion, the non-printing portions of said printing rolls being of sizes which when confronting each other enable the entrance and exit of a said article between said printing rolls without contact therewith, the printing portions of said printing rolls being of a size which when rotated to confront each other contact said article simultaneously;

a turret rotatably mounted on said frame having article supporting mandrels rotatably mounted thereon equiangularly on axes radially extending from the rotational axis of said turret, said turret being positioned such that the article supporting mandrels carry said articles supported thereon between said printing rolls upon rotation of said turret through a printing station for each said article



mounted thereon wherein upon rotation of said printing rolls the printing portions thereof contact the surface of said article;

indexing means operably connected to said turret to rotate said turret intermittently between dwell positions in which each said mandrel successively is positioned to hold a said article at said printing station;

control drive means operably connected to and continuously driving said turret indexing means and continuously rotating said printing rolls in synchronism thereby to accomplish printing of a said article by simultaneous contact of said printing portions of said printing rolls during the dwell position of a said mandrel mounted article at said printing station; and

mandrel rotating means mounted for rotation on the same axis as one said printing rolls apart from said printing portion thereof to be rotated therewith to engage and rotate each mandrel while in the printing station at the same speed as said printing rolls.

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**3,977,319**

**DRUM COLUMN PRINTER**

**Charles S. Mogtader, Beverly Hills, Calif., assignor to Dataproducts Corporation, Woodland Hills, Calif.**

**Continuation of Ser. No. 457,464, April 3, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,838**

**Int. Cl.[2] B41J** *9/12*

**U.S. Cl. 101—93.08** **2 Claims**

1. An apparatus for printing a page of text by printing successive vertical columns, each column containing one character in each horizontal line of text, said apparatus comprising:

a plurality of hammers having impact faces disposed in alignment along a print row;

a cylindrical drum mounted adjacent to said hammers with the axis of said drum extending parallel to said print row;

a plurality of raised characters formed on the surface of said drum disposed in columns extending parallel to said drum axis and rings extending around said drum axis, said characters being shaped to define letters of the alphabet and being oriented such that the shortest possible line

between the top and bottom of each character extends substantially parallel to said drum axis;

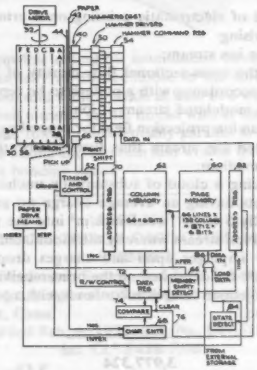
means for continually rotating said drum about said drum axis to sequentially bring successive columns of characters on said drum surface into alignment with said print row;

means for alternately moving and stopping a paper web to be printed upon along a path between said drum and said hammers;

a first memory means for storing a plurality of codes equal in number to said plurality of hammers, each code identifying a character to be printed in a particular line of a single column of text;

a second memory means for storing multiple sets of codes, each set identifying the characters to be printed in a particular column of text;

means for transferring each of said code sets, one set at a time, from said second memory means to said first memory means, in substantial time coincidence with said moving of said paper web;



character counter means defining a code identifying the next character column moving into alignment with said print row;

means for generating a timing pulse in synchronism with each successive character column moving into alignment with said print row;

means responsive to each timing pulse for changing the code defined by said character counter means;

means operable between successive timing pulses for sequentially comparing all of said codes stored by said first memory means with the code identified by said character counter means to detect matches therebetween;

a hammer command register including a plurality of binary stages, each operably connected to a different one of said plurality of hammers, each stage capable of selectively defining a set or reset state;

means responsive to each match detected by said comparing means for forcing a stage of said hammer command register to said set state; and

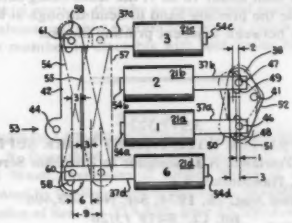
means responsive to all hammer command register stages defining a set state for simultaneously impacting the hammers connected thereto against said drum.

## 3,977,320

## ELECTRICALLY CONTROLLED POSTAGE METER

**Raymond R. Lupkas, Trumbull, and Keith E. Schubert, Rowayton, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Mar. 18, 1975, Ser. No. 559,491**
**Int. Cl.² B41J 7/48, 7/54**
**U.S. Cl. 101—110** **9 Claims**



**1. In an electrically controlled postage meter having a printing drum containing a plurality of print wheels each of which provide one digit of a multi-digit postage value, a print wheel setting rack operatively connected to said print drum for individually positioning each print wheel to a postage value position, and electromechanical setting means operatively connected to said print wheel setting rack for moving said print wheel setting rack for positioning said print wheels, an electromechanical setting means comprising: a plurality of modularized setting banks, one bank for each print wheel, each bank having a first and a second set of solenoids substantially arranged within a common plane with respect to each other, the first and second set of solenoids in each bank being movably carried by a movable frame module operatively connected to said print wheel setting rack, such that when said first set of solenoids is actuated said frame module and said first and second set of solenoids are caused to move, and when said second set of solenoids is actuated said print wheel setting rack is caused to move while said frame module is caused to remain stationary said first and second set of solenoids being selectively actuated by electrically coded signals to provide any one of a multiple of print wheel postage value positions.**

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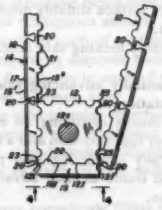
## 3,977,321

## PRINTING BAND

**Robert M. Pabodie, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio**

**Continuation of Ser. No. 176,889, Sept. 1, 1971, abandoned. This application May 23, 1973, Ser. No. 363,214**
**Int. Cl.² B41J 1/20**
**U.S. Cl. 101—111** **10 Claims**



**1. For a printer: a unitary flexible printing band including a plurality of printing blocks having respective base portions, a plurality of flexible hinges, each hinge joining adjacent printing blocks at their base portions, at least one tooth integrally**

formed on the underside of each base portion of each printing block, but there being no tooth on the underside of any hinge, the printing blocks being longer at their outer portions than at their base portions, printing elements formed on the outer portions of the printing blocks opposite their respective base portions and extending beyond at least one end of the respective base portions, each hinge having a ratio of hinge length to hinge thickness of at least about 4 to 1, and the ratio of the length of a printing block at its outer portion to the length of the gap between adjacent printing blocks at their outer portions being at least about 10 to 1, the teeth being sufficiently small to enable the printing band to bend through at least 45° at each hinge between adjacent printing blocks.

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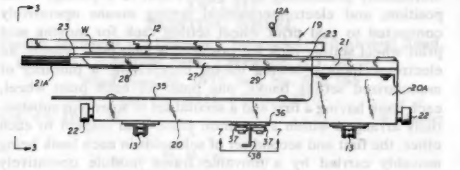
## 3,977,322

## SCREEN PRINTER WITH PALLET WORK SUPPORT

David Jaffa, Fairlawn, N.J., assignor to Precision Screen Machines Inc., Hawthorne, N.J.

Filed Aug. 26, 1974, Ser. No. 500,406
Int. Cl.² B41F 15/26
U.S. Cl. 101—126 13 Claims



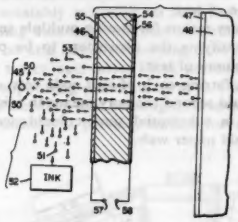
10. In combination a screen printing machine comprising
a frame,
a printing head mounted on said frame to define a printing station,
a plurality of pallet members,
each of said pallet members including a base member connected to said endless drive having a portion extending substantially normal thereto,
said base member having a raised portion adjacent one end thereof,
a laterally extending arm connected to said raised portion,
said arm being spaced from said base portion extending normal to said endless drive,
an article support surface slidably mounted on said laterally extending arm,
means for releasably locking said article support surface to said arm,
means for sequentially advancing said pallet members to said printing station,
said advancing means including an endless flexible drive having an upper flight portion and a lower flight portion,
means for laterally stabilizing said pallet members with respect to said frame as they advance to and from said printing station,
means for supporting said pallet members advancing along the lower flight of said endless drive, and
means connected to said endless drive adjacent each side of said pallet members for minimizing any whipping action of said pallet members as said pallet members round the ends of said endless drive.

## 3,977,323

## ELECTROSTATIC PRINTING SYSTEM AND METHOD USING IONS AND LIQUID AEROSOL TONERS

Gerald L. Pressman, San Jose; David E. Blake, Woodside, and Hugh F. Frohbach, Sunnyvale, all of Calif., assignors to ElectroPrint, Inc., Cupertino, Calif.

Continuation of Ser. No. 425,750, Dec. 18, 1973, abandoned, and a continuation-in-part of Ser. No. 101,681, Dec. 28, 1970, Pat. No. 3,779,166. This application June 2, 1975, Ser. No. 583,076
Int. Cl.² G03G 13/06
U.S. Cl. 101—426 11 Claims




6. A method of electrostatic printing on a print receiving medium comprising:
generating an ion stream;
modulating the cross-sectional flow density of ions in the stream in accordance with a pattern to be reproduced to produce a modulated stream of ions;
establishing an ion projection field for propelling the ions of a modulated ion stream thus formed toward the print receiving medium;
and introducing a cloud of substantially uncharged liquid ink droplets having an average charge no greater than substantially $5 \times 10^{-7}$ coulombs/m² into the path of the modulated ion stream whereby the modulated ion stream selectively impinges upon and charges droplets in the cloud which are deposited on the print receiving medium by said projection field in accordance with a pattern to be reproduced.

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## 3,977,324

## SABOTLESS MICRO PROJECTILE

Thomas Stevenson, Huntingdon Valley, Pa., and John J. Scanlon, Jr., Willingboro, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 13, 1964, Ser. No. 337,506
Int. Cl.³ F42B 9/16
U.S. Cl. 102—38 7 Claims

1. A dart type projectile having a bore size cylindrical portion of a length at least as long as the diameter thereof, a conical nose extending forwardly of said cylindrical portion and having a taper of substantially 16°, a rearwardly extending shaft, and four stabilizing fins having longitudinally extending peripheral edge portions longitudinally aligned with peripheral portions of said cylindrical portion, of an axial length at least that of said cylindrical portion, and of a width capable of supporting said projectile as the cylindrical portion leaves a smooth bore gun barrel, said shaft extending rearwardly from said cylindrical portion to said fins, the periphery of said fins and said cylindrical portion being concentric to within about

one ten thousandth of an inch, said nose having a density substantially twice that of iron to reduce retardation to about one foot per second of velocity with an initial velocity of about 3,800 feet per second.

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**3,977,325**

## COMBUSTIBLE CARTRIDGE CASINGS AND METHOD FOR MAKING SAME

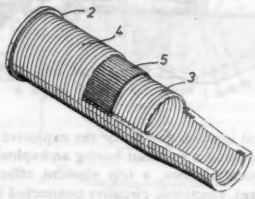
**Kjell Ole Jacobsen, Lillestrom, and Edvard Troen, Raufoss, both of Norway, assignors to A/S Raufoss Ammunisjonsfabrikker, Norway**

**Filed May 28, 1974, Ser. No. 474,007**

**Claims priority, application Norway, May 25, 1973, 2179/73**

**Int. Cl.² F42B** *5/18, 9/16*

**U.S. Cl. 102—43 R** **7 Claims**




**1.** A combustible casing for ammunition having walls comprised substantially of nitrocellulose in the form of nitrated textile, wherein said walls contain at least two wound layers of fiber reinforced nitrated textile thread with at least one of said layers of thread running substantially parallel to the longitudinal axis of the casing and wherein said wound thread is bonded together by a bonding agent.

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**3,977,326**

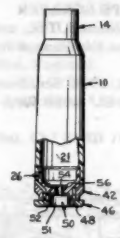
## COMPOSITE CARTRIDGE CASING AND METHOD OF ASSEMBLY

**Raymond A. Anderson, Easton, and John J. Scanlon, Monroe, both of Conn., assignors to Remington Arms Company, Inc., Bridgeport, Conn.**

**Filed Feb. 6, 1975, Ser. No. 547,519**

**Int. Cl.² F42B** *7/06*

**U.S. Cl. 102—43 P** **6 Claims**




**1.** The method of forming a composite cartridge casing which comprises the steps of:

forming a tubular casing body with a mouth portion of a first diameter at a forward end thereof for receiving a selected projectile in gas-sealing mechanically-secured relation therein, and with an open-ended breech portion having an interior cylindrical wall of a second diameter greater than said first diameter and extending to a rearward base end thereof;

forming a bridge insert member with a forward annular cup portion of substantially said second diameter to be received conformably in circumferential engagement with said interior wall of said breech portion, and with a rearward annular skirt portion of reduced diameter;

then inserting said bridge insert member through said breech portion into circumferential engagement of said cup portion thereof with said interior wall of said breech portion, with said skirt portion extending within said breech portion rearwardly from said cup portion toward said base end of said breech portion;

and then permanently deforming said breech portion to reduce its diameter in a region thereof spaced rearwardly from said cup portion and circumferentially spaced about said skirt portion, thereby to engage said region conformably about said skirt portion to securely retain said bridge insert member in assembly with said casing body.

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**3,977,327**

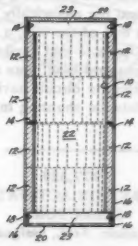
## CONTROLLED FRAGMENTATION WARHEAD

**Benjamin R. Brumfield, Seattle, and Clayton J. Julien, Kent, both of Wash., assignors to United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Continuation of Ser. No. 373,550, June 25, 1973, abandoned. This application Feb. 4, 1975, Ser. No. 547,849**

**Int. Cl.² F42B** *13/48*

**U.S. Cl. 102—67** **10 Claims**




**1.** A controlled fragmentation warhead comprising in combination:

a. A plurality of substantially identical elongated fragments, each having a longitudinal axis, assembled about a common axis to form

form an annular structure having annular ends, said common axis being the longitudinal axis of said annular structure, said annular structure being comprised of substantially identical and contiguous annular rows of said fragments, the fragments in each of said annular rows being substantially contiguously disposed such that the longitudinal axes of the fragments in each of said annular rows are parallel to said common axis;

b. Means to enclose said annular structure so as to form a closed cavity therein, said enclosing means being so formed that said closed cavity includes an annular end space contiguous to each of said ends of said annular structure;

c. An explosive charge completely filling said closed cavity; and

d. Means for substantially simultaneously detonating said explosive charge at both ends thereof,! whereby axial as well as radial explosive pressure is applied to said fragments by said detonation at both ends.

## 3,977,328
## DETONATORS

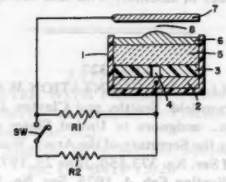
**Kenneth Raymond Brown, Broadstone; Rodney Lane, Wareham, and Douglas Reginald Luff, Poole, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Filed Oct. 1, 1973, Ser. No. 399,934**

**Claims priority, application United Kingdom, Oct. 2, 1972, 45429/72**

**Int. Cl.² F42C** *11/02;* **C04B** *35/00*

**U.S. Cl. 102—70.2 GA** **3 Claims**




**3.** In a detonator having an inert cup, having the closed bottom and an opposite open end, an electrically conducting disc disposed in the cup against the said bottom, an electrically insulating washer disposed over said disc, said washer having a hole therethrough, a piezoelectric disc disposed on said washer, with the said hole providing a spark gap between the piezoelectric disc and the electrically conductive disc, an anvil closing said open end of the cup, a base plate disposed in spaced relationship opposite said anvil outside said cup, an electrical circuit between said base plate and said electrically conductive disc, said electric circuit having a arming switch therein and a high-resistance shunting means bypassing said arming switch.

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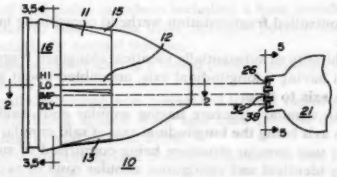
## 3,977,329
## SHOCK-ACCELERATION ACTIVATED FUNCTION SELECTOR

**Gerald L. Wilde, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Oct. 25, 1974, Ser. No. 517,994**

**Int. Cl.² F42C** *11/00*

**U.S. Cl. 102—70.2 R** **5 Claims**




**1.** A mode function selector in a device which includes means for enabling the device to perform a function in different modes, when the device is subjected to a shock, the selector comprising:

a. circuit means having a plurality of conductive paths associated with said different modes,

b. shock actuable cutting means,

c. means for aligning selected one of said plurality of different conductive paths with said shock actuable cutting means, and

d. detent means for locking said aligning means in the selected one of the modes, whereby, when said device is subjected to the shock, said cutting means is actuated to sever the selected path to effect the selected mode of operation.

## 3,977,330
## WARHEAD CONSTRUCTION HAVING AN ELECTRICAL IGNITION DEVICE

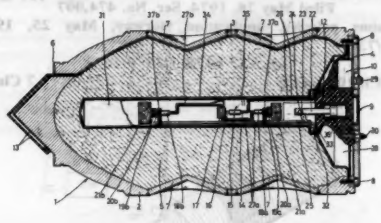
**Manfred Held, Kuhbach, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Germany**

**Filed Feb. 20, 1974, Ser. No. 444,184**

**Claims priority, application Germany, Feb. 23, 1973, 2308912**

**Int. Cl.² F42C** *11/00;* **F42B** *13/10*

**U.S. Cl. 102—70.2 R** **5 Claims**



**1.** An electrical ignition device for the explosive charge of a warhead, comprising a warhead having an explosive charge therein with a central bore, a trip element effective upon contact with target, electronic circuitry connected to said trip element for actuartion thereby to deliver a voltage impulse, an ignition train connected to said circuitry and having an operative position and a safety position and including a first member responsive to the voltage impulse and an erid member connected to said first member and the explosive charge and effective with the ignition train in its ready position to set off the explosive charge, and a delay member connected between said first member and said end member for actuating said end member after a time interval starting at the response of the first member and predetermined by said delay member, said warhead having a bottom at its trailing end, the electronic circuitry being located inside said warhead adjacent said bottom, and said ignition train all being mounted in the bore of said explosive charge at a location extending inwardly from said warhead bottom, and an elongated bushing arranged in the bore of said explosive charge, said bushing having a lining of aluminum.

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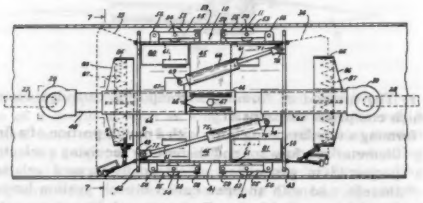
## 3,977,331
## PIPE SCRAPER

**Edward Albert Clavin, Houston, Tex., assignor to Mid-Continent Pipeline Equipment Company, a division of Harrisburg, Inc., Houston, Tex.**

**Filed Dec. 20, 1974, Ser. No. 534,823**

**Int. Cl.² B08B** *9/02*

**U.S. Cl. 15—104.17** **17 Claims**



**1.** Apparatus for scraping the interior wall of a pipe, comprising carriage means movable longitudinally through the pipe, circumferential scraper means carried around each end of said carriage means, each said scraper means being expandable against the pipe wall and retractable therefrom, whereby

said apparatus may be employed to scrape the interior wall of a pipe when moved in either direction through the pipe.

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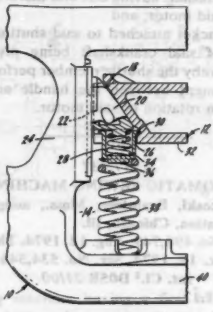
3,977,332

## VARIABLY DAMPED TRUCK

Robert L. Bullock, Lombard, Ill., assignor to Standard Car Truck Company, Chicago, Ill.

Filed June 25, 1975, Ser. No. 590,294
Int. Cl.² B61F 5/12, 5/50; F16F 1/06, 3/04
U.S. Cl. 105—197 DB 3 Claims



1. A stabilized railroad car truck including a side frame having a window, a bolster extending into the window, a stabilizer pocket on each side of the bolster and a friction element in each pocket, the improvement comprising spring means supporting each friction element including an upper spring and a lower spring, an opening in said bolster in alignment with each stabilizer pocket, a cup-shaped spring support member supported on said bolster under light load conditions and extending through said bolster opening, an outwardly directed flange on the upper end of said cup-shaped spring support member, with said flange being supported by said bolster about the opening thereof, said upper spring being precompressed within said spring support member and between said spring support member and said friction element, said lower spring being supported on said side frame and having an upper coil thereof in contact with the bottom surface of said cup-shaped spring support member.

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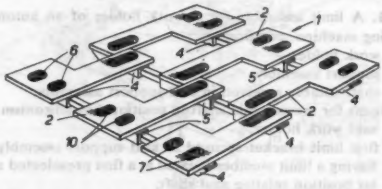
3,977,333

## STILLAGES

John Phillips, Burry Port, Wales, assignor to British Steel Corporation, London, England

Filed June 10, 1975, Ser. No. 585,487
Claims priority, application United Kingdom, June 12, 1974, 26068/74
Int. Cl.² B65D 19/38
U.S. Cl. 108—54.1 8 Claims



1. An adjustable stillage for supporting stacked metal sheets, comprising: at least four relatively movable, irregularly shaped members having substantially co-planar load bearing surfaces and movable to abut and form a substantially unbroken, rectangular, load bearing, minimum, platform area comprised of two transverse rectangular sections; each of said sections formed by two of said irregularly shaped members, a central elongate support means and two outside elongate support means aligned in the same direction and disposed below said members, said central support means being attached to all of said members and said outside support means each being attached to at least two of said members permitting the members to be relatively movable to each other to a limited extent to vary the platform area in two mutually perpendicular directions.

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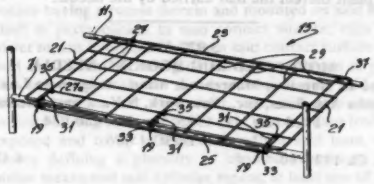
3,977,334

## PIVOTABLY MOUNTED SHELF

Wilfred J. Carroll, Etobicoke, Canada, assignor to Carroll Wire Sales, Etobicoke, Canada

Filed June 5, 1975, Ser. No. 583,993
Int. Cl.² A47F 5/01
U.S. Cl. 108—134 9 Claims



1. A shelf for pivotable mounting on a wire cart, said cart comprising at least one horizontally extending rod for pivotably supporting said shelf, said shelf comprising;

a surrounding frame member having a first edge disposed adjacent said rod;

a plurality of wires extending in parallel with said first edge and disposed in the interior of said frame member;

and pivoting means comprising at least one elongate means extending substantially perpendicularly to said first edge, one end of said elongate means being pivotably attached to said rod, the other end of said elongate means being pivotably attached to one of said plurality of wires disposed in the interior of said frame member.

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3,977,335

## AUTOMATED HAIR IMPLANTATION SYSTEM

Albert W. Bonham, 3594 South 3610 East, Salt Lake City, Utah 84109

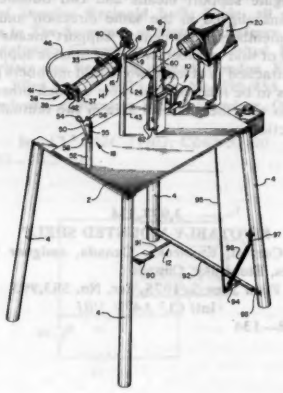
Filed Sept. 25, 1974, Ser. No. 509,096
Int. Cl.² D05C 15/02
U.S. Cl. 112—79 R 29 Claims

1. Apparatus for implanting hair in a scalp base comprising means for holding a bundle of hairs,

a needle hollowed out at least at one end thereof, and

means for moving the needle generally in a first direction toward the hair ends to contact the hair ends and receive

into the hollowed out end at least one hair, and then generally in a second direction different from the first



direction as the needle penetrates the scalp base to implant therein the hair carried by the needle.

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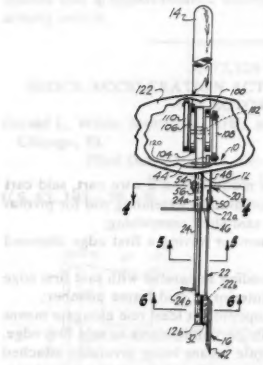
**3,977,336**

## MOTORIZED RUG HOOKING NEEDLE

**Leone K. Gauslow, Moorehead, Minn., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed Nov. 11, 1975, Ser. No. 630,934**
**Int. Cl.² D05C *15/06***
**U.S. Cl. 112—80** **6 Claims**



**1.** In a hooking needle including an elongated bar having a handle attached at one end thereof, a needle member fixed to the opposite forward end of the bar, the needle member defining an open-ended enclosure having a yarn-receiving passage and a looper-receiving passage extending longitudinally therethrough, the needle member including a fabric-penetrating portion frontwardly extending in the longitudinal axis of the bar, a shuttle member mounted to the bar for reciprocating movement thereon between the handle and the needle member, an elongated looper member having one end attached to the shuttle member and the opposite forward end slidably received in the looper-receiving passage of the needle member, a presser member slidably mounted on the elongated bar and extending longitudinally thereof, the presser member having a forward portion adapted to rest against the fabric to be hooked, means for adjusting the relative position of the presser member to the bar and to the shuttle member to thereby vary the relative position of the forward end of the presser member to the forward end of the looper member, a coupling member in abutting engagement with the presser member adjacent the rear end thereof, and releasably fastening means for fixing the coupling member to the rear portion of the presser member, the improvement comprising:

a shaft-receiving member formed with a circular opening and included within the bar;

a motor having a shaft attached thereto, said shaft passing through said opening in said shaft-receiving member and being rotatable therein;

at least one crankshaft having one end thereof eccentrically pivoted on said motor; and

at least one bracket attached to said shuttle member, the other end of said crankshaft being pivoted on said bracket, whereby the shuttle member performs a reciprocating movement between the handle and the needle member upon rotation of said motor.

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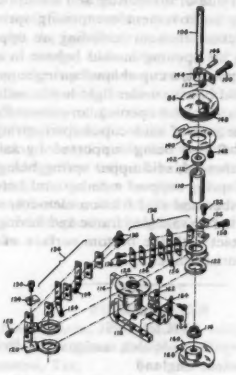
**3,977,337**

## AUTOMATIC SEWING MACHINE

**Florian F. Yanikoski, Braintree, Mass., assignor to Union Special Corporation, Chicago, Ill.**

**Division of Ser. No. 496,749, Aug. 12, 1974. This application Dec. 19, 1974, Ser. No. 534,546**
**Int. Cl.² D05B *21/00***
**U.S. Cl. 112—121.12** **26 Claims**



**21.** A limit assembly for a work holder of an automatic sewing machine, comprising:

a work holder;

a support assembly;

a shaft rotably received in said support assembly;

means for moving said shaft in positional synchronism with said work holder;

a first limit bracket secured to said support assembly and having a limit member located at a first preselected angular position relative said shaft;

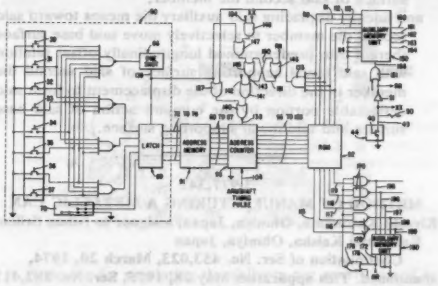
a second limit bracket secured to said support assembly and having a limit member located at a second preselected angular position relative said shaft; and

a trigger connected to said shaft and movable only between the limit members of said first and second limit brackets so as to limit movement of the work holder.

## 3,977,338
## FEED REVERSING ARRANGEMENT FOR SEWING MACHINES

John W. Wurst, Dover, and Stephen A. Garron, Elizabeth, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed May 21, 1975, Ser. No. 579,511
Int. Cl.² D05B 27/00, 3/02
U.S. Cl. 112—210 4 Claims



1. A sewing machine having a first electronic memory means for producing electronic pattern information signals which influence the stitch configuration to produce an ornamental stitch pattern, an arrangement for providing on command of the sewing machine operator a predetermined stitch configuration, comprising a manually operable electric switch means on said sewing machine, auxiliary electronic memory means having stored therein means for generating electronic signals dictating said predetermined stitch configuration, means rendered effective during manual operation of said manually operable electric switch means for interrupting said pattern information signals and substituting therefor said signals dictating said predetermined stitch configuration, means rendered effective upon termination of manual operation of said manually operable electric switch means for reestablishing effectiveness of said pattern information signals.

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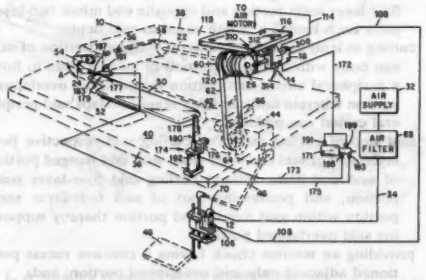
## 3,977,339
## PNEUMATIC NEEDLE POSITIONING APPARATUS FOR STITCHING MACHINES

William A. Tice, 3620 N. Fountaincrest Drive, Knoxville, Tenn. 37918

Continuation-in-part of Ser. No. 504,324, Sept. 9, 1974, Pat. No. 3,924,553. This application Dec. 8, 1975, Ser. No. 638,706
Int. Cl.² D05B 69/22, 65/02
U.S. Cl. 112—219 B 9 Claims



1. In a stitching machine including a needle adapted for reciprocatory movement into and out of a workpiece, shaft means connected to said needle for reciprocating said needle upon rotation of said shaft, drive means including a drive motor for rotating said shaft, operator control means for activating and deactivating said drive means, the improvement for positioning said needle in a preselected position along its reciprocatory path comprising

a pneumatically powered positioning motor,

means connecting said positioning motor in driving relation to said shaft means for rotation of said shaft means when said drive motor is inactive,

a source of pneumatic pressure,

conduit means connecting said source of pneumatic pressure to said positioning motor,

valve means interposed in said conduit means and actuatably responsive to functioning of said operator control means,

control means interposed in said conduit means between said valve means and said positioning motor and operative when said valve means is open to activate said positioning motor to rotate said drive shaft to position said needle in a preselected position along its reciprocatory path,

said control means comprising cylinder means having a bore extending therethrough, piston means disposed in said bore and having one of its ends exposed to said pressurized fluid when said valve means is open, the opposite end of said piston means being exposed externally of said cylinder means and defining a contact surface, cam means having a recess therein and mounted on said drive shaft in juxtaposition to said contact surface, cam follower means interposed between said contact surface and said cam means including detent means thereon in position to engage said cam means, means biasing said cam follower means out of contact with said cam means, means defining a passageway in said piston means from its exposed end to an exit location within said bore, seal means defining a plurality of chambers between said piston means and said cylinder means, at least one of said chambers communicating with said exit location of said passageway in said piston means, and means defining an exit passageway from said bore to the exterior of said cylinder means at a location contiguous to said chambers, whereby the position of said piston means within said bore establishes fluid communication between at least one of said chambers and said exit passageway to control the flow of pressurized fluid to said positioning motor.

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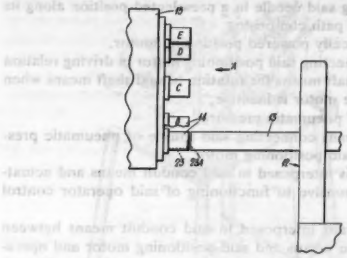
## 3,977,340
## DIAPHRAGM CLOSED CANS

Robert Ernest Geeson, Pinner, England, assignor to Metal Box Limited, Reading, England

Division of Ser. No. 287,332, Sept. 8, 1972, abandoned. This application Apr. 8, 1975, Ser. No. 566,524
Claims priority, application United Kingdom, Sept. 27, 1971, 44919/71
Int. Cl.² B21D 51/26, 51/34
U.S. Cl. 113—1 E 8 Claims

1. Apparatus for forming a can body having an inwardly directed overfolded flattened peripherally extending bead comprising a mandrel adapted to receive in external telescopic relationship thereto a longitudinally seamed can body having an inwardly directed overfolded peripherally extending bead, said mandrel including an end wall in axially opposed relationship to an overfolded bead of a can body in external telescopic relationship with said mandrel, recess means in said end wall for receiving a seamed overfolded portion of a can body, means cooperative with said mandrel end wall for flattening an overfolded bead of an associated can body and being additionally cooperative with said recess means for moving the overfolded seamed portion into said recess means whereby

a surface of said flattened bead adapted to receive a diaphragm lies in a common plane and axially extending recess



means in said mandrel for receiving a remaining seamed portion of an associated can body.

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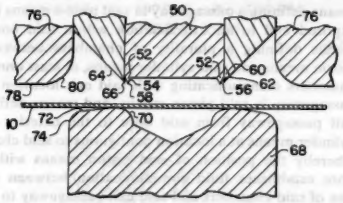
3,977,341

## EASY OPENING CONTAINER COMPONENT

Charles L. Jordan, Pittsburgh, and Richard C. Speer, Lower Burrell, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 477,074, June 6, 1974, Pat. No. 3,902,626.
This application Mar. 13, 1975, Ser. No. 558,143
Int. Cl.² B21D *51/38*
U.S. Cl. 113—15 A 9 Claims



1. In the formation of a sheet metal container component having at least one substantially rigid inwardly displaceable opening panel and an outwardly projecting deflectable portion disposed in integral interconnected relation therewith by a fracturable web,

the steps of:

introducing a sheet of metal intermediate a first die member having a first substantially planar metal working surface and a second and angularly disposed substantially planar metal working surface defining with said first surface a corner at the locus of intersection therebetween, said corner having a relatively sharp edge thereon and the outline of the fracturable web to be formed around an opening panel in the sheet metal,

and a second die member having a metal supporting and shaping surface thereon generally facing said first die member including a rounded corner generally projecting toward and having the same outline as said corner between said first and second surfaces on said first die member,

and with auxiliary die means disposed on the same side of the sheet as said first die member having a metal shaping base surface facing in a generally opposite direction from said metal supporting and shaping surface of said second die member and in laterally spaced relation therewith outwardly of the opening panel to be formed as outlined by the corners on said first and second die members;

linearly displacing said first die member toward said second die member to selectively move said first and second surfaces of said first die member into operative proximity with said rounded shoulder of said second die member, and thereby engage said sheet to laterally displace portions of said sheet as said corner penetrates the sheet to form a V-shaped indentation in the outer surface of the sheet and a rounded impression in the inner surface of the sheet with said fracturable web therebetween,

stopping said die member displacement when said corner of said first die member has penetrated the sheet to within a few thousandths of an inch of said metal supporting surface of said second die member,

and linearly displacing said auxiliary die means toward said second die member to selectively move said base surface thereof into predetermined longitudinally offset relation with said metal supporting surface of said second die member in the direction of die displacement to form said deflectable portion by the conjoint action of said base surface and said metal supporting surface.

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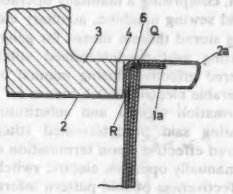
3,977,342

## METHOD OF MANUFACTURING A METALLIC CAN

Kiyoshi Kawamata, Ohmiya, Japan, assignor to Nihon Seikan Kabushiki Kaisha, Ohmiya, Japan

Continuation of Ser. No. 453,023, March 20, 1974, abandoned. This application May 28, 1975, Ser. No. 582,411
Claims priority, application Japan, Sept. 13, 1973, 48-103543
Int. Cl.² B21D *51/32*
U.S. Cl. 113—120 K 3 Claims



1. A method of manufacturing a metallic can of generally square cross-section, said method comprising:

providing a rectangular metal sheet blank to form the body of a can;

cutting completely through said blank at all four corners thereof to form equal cutout portions all extending to an equal depth;

applying an adhesive material to opposite sides of said blank to be overlapped and joined to form a can body seam and to edges of said cutout portions;

thereafter folding said opposite sides of said blank to form a can body having a seam including a major intermediate four-layer seam portion and opposite end minor two-layer parts each having a length equal to said depth;

curling at least one end peripheral marginal portion of said can body with a flanged portion of an end plate to form a peripheral curled can portion including an overlapped portion wherein said can body seam overlaps said peripheral curled can portion;

said step of curling including curling said respective two-layer part of said can body seam with said flanged portion of said end plate without curling said four-layer seam portion, and positioning part of said four-layer seam portion within said overlapped portion thereby supporting said overlapped portion;

providing an interior chuck having a concave recess positioned adjacent only said overlapped portion; and

said step of curling further including pressing said peripheral curled can portion toward said chuck, and pressing said overlapped portion into said concave recess.

## 3,977,343

## FUEL INJECTION PUMP REGULATING DEVICE

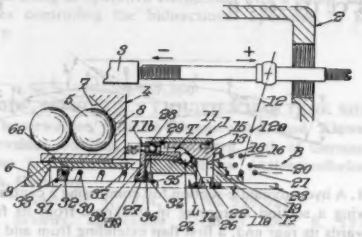
Claude Gauche, deceased, late of Lyon, France, by Michele Gauche nee Lelandais, administrarix, assignors to Sigma Diesel, Venissieux, France

Filed Mar. 17, 1975, Ser. No. 558,646

Claims priority, application France, Mar. 19, 1974, 74.09329

Int. Cl.² F02D *1/04, 1/06*

U.S. Cl. 123—140 R 12 Claims



1. A device for regulating the delivery per revolution of an in-line fuel injection pump which is adapted to supply an internal combustion engine and which comprises a longitudinally slidable control rod movable under the control of a governor responsive to the engine speed, said device comprising a pusher movable by the governor in response to engine speed variations, a sleeve connected to the control rod, means operatively connecting said pusher and said sleeve, and resilient abutment means associated with the governor, said device being characterised by said pusher having a pusher surface which is inclined to the axial direction of said pusher and by said means operatively connecting the pusher and the sleeve comprising a retaining element on which said sleeve is freely slidable and which has a surface inclined to the pusher axis and convergent with said pusher surface, rolling elements which are disposed between said inclined surface of said retaining element and said pusher surface, and means for transmitting axial movements of said rolling elements to said sleeve, said resilient abutment being adapted to co-operate at one end with said retaining element.

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## 3,977,344

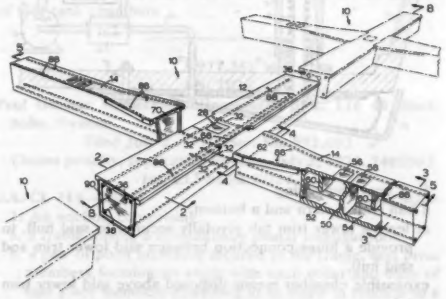
## FLOATABLE CONCRETE STRUCTURES

John George Holford, 1350 Winding Trail No. 33, Mississauga, Ontario, Canada

Filed Oct. 7, 1974, Ser. No. 512,898

Int. Cl.² B63B *35/00*

U.S. Cl. 114—.5 F 6 Claims



1. A floating concrete dock comprising,

a. a plurality of walkway units each consisting of a hollow buoyant body of concrete material having an upper surface, a lower surface, a pair of oppositely disposed end faces and a pair of oppositely disposed side faces and a water line disposed adjacent said upper surface, first passage means extending through each unit and opening through said side faces thereof at at least one location along the length thereof and second passage means extending longitudinally thereof and opening through said end faces, said first passage and second passage means each including upper passage means disposed adjacent said upper surface and lower passage means disposed below said water line adjacent said lower surface,

b. a plurality of modular slipway units each consisting of a hollow buoyant body of concrete material having an upper surface and a lower surface and oppositely disposed end and side faces, and a water line disposed adjacent said upper surface, first passage means extending through each slipway unit and opening through said oppositely disposed end faces, said first passage means of said slipway including upper passage means disposed adjacent said upper surface and lower passage means disposed below said water line adjacent said lower surface,

c. first tensioning cable means extending through said passage means of each slipway unit and said first passage means of an associated walkway unit, said cable means being tensioned and anchored with respect to a slipway unit and its associated walkway unit to secure them together and prevent relative movement therebetween in a vertical plane,

d. second tensioning cable means extending through said second passage means of each of said walkway units, said second tensioning cable means being tensioned and anchored with respect to said walkway units to secure them together and prevent relative movement therebetween in a vertical plane.

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## 3,977,345

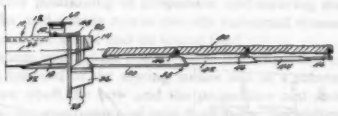
## HYDRAULIC ICE BREAKER

Robert W. Worthing, Oklahoma City, Okla., assignor to North American Development Company, Chevy Chase, Md.

Division of Ser. No. 280,801, Aug. 15, 1972, Pat. No. 3,877,407. This application Feb. 6, 1975, Ser. No. 547,396

Int. Cl.² B63B *35/08*

U.S. Cl. 114—40 6 Claims

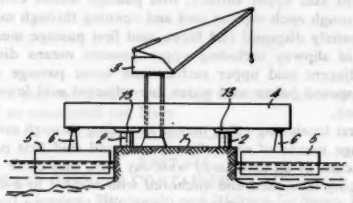


1. A method of forming a hole in a layer of solid, unfractured ice at the surface of a body of water in order to fracture the layer comprising: passing a stream of water obtained from the body of water through a pump to produce a high pressure stream of water, conducting the high pressure stream from the pump to a sub-surface nozzle from which the stream is discharged as a high pressure jet, directing the jet against the lower surface of the unfractured ice layer to thereby form a hole through the ice layer.

## 3,977,346
## DECK STRUCTURE AND METHOD FOR BUILDING SAME

Birger Johannes Natvig; Per Christian Sandnaes; Per-Gustav Lindeberg, all of Oslo, and Olaf Salvesen, Blommenholm, all of Norway, assignors to A/S Akers Mek. Verksted, Oslo, Norway

Filed July 1, 1974, Ser. No. 484,794
Claims priority, application Norway, July 5, 1973, 2763/73
Int. Cl.² B63B 9/00
U.S. Cl. 114—65 R 13 Claims

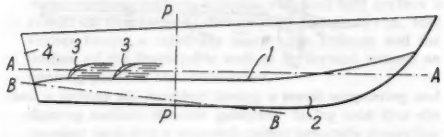


1. A method of constructing an off-shore deck structure capable of being transferred to and supported by a base structure positioned within a body of water, the method comprising: selecting a building site surrounded on at least two sides by water; arranging supporting members on the building site; constructing the deck structure in a substantially horizontal orientation on the supporting members; and, connecting floatation members to lateral ends of the deck structure and the floatation members extending into the water so as to enable the deck structure to be removed from the building site, while leaving the floatation members in the water, and transferred to a location at which it is to be utilized.

## 3,977,347
## PLANING OR SEMIPLANING BOAT

Bror With, Jarlsborgveien 1, Oslo 3, Norway

Filed June 19, 1974, Ser. No. 480,839
Claims priority, application Norway, June 25, 1973, 2623/73
Int. Cl.² B63B 1/18
U.S. Cl. 114—66.5 S 9 Claims




1. Boat of the planing or semiplaning type, the bottom of which tapers aft with curved curvature from the cross-sectional plane of greatest width and in its rear portion is substantially straight in the longitudinal direction, characterized in that substantially at the said cross-sectional plane the boat sides are shaped with rearwardly facing exterior steps formed at approximately the maximum width of the bottom of the boat and extending from above the highest water line of the boat substantially to the respective transitions of the boat sides to the bottom.

## 3,977,348
## ADJUSTABLE HYDRODYNAMIC SECTION FOR SUBMERGED FOILS

Andre Jules Edmond Bordat, Paris, and Michel Auguste Achille Pouillot, Lambesc, both of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France

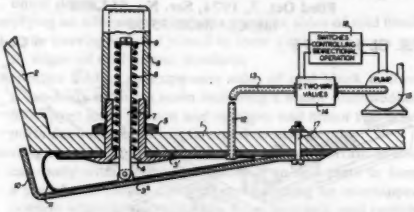
Filed May 16, 1975, Ser. No. 578,158
Claims priority, application France, May 21, 1974, 74.17578
Int. Cl.² B63B 1/22
U.S. Cl. 114—66.5 H 6 Claims

1. A hydrodynamic-section foil comprising a central portion having a section increasing in thickness from its front end towards its rear end, a first flap extending from and pivotally connected to the front end of said central portion to form a leading edge for the foil, said first flap being adapted to trigger cavitation from said leading edge of the foil, a second camber-changing flap, extending from and pivotally connected to the rear end of said central portion to form a trailing edge for the foil, said second flap being adapted to modify and control hydrodynamic lift or bearing of the foil in various operating conditions, and a third auxiliary flap for triggering or obviating thickness cavitation, said auxiliary flap having a shorter chord than said second flap and extending from and being pivotally connected to the rear end of said central portion above said second flap to cooperate therewith for altering the foil section shape in subcavitating and transcavitating conditions, the sum thickness of the respective sections of said second and third flaps decreasing towards the trailing edge of the foil from a maximum value substantially equal to the section of the rear end of said central portion.

## 3,977,349
## BOAT POSITIONING DEVICE

Max Hummel, 164-02 95th St., Howard Beach, N.Y. 11414

Continuation-in-part of Ser. No. 527,747, Nov. 27, 1974, abandoned. This application July 9, 1975, Ser. No. 594,529
Int. Cl.² B63B 1/22
U.S. Cl. 114—66.5 P 1 Claim




1. A boat comprising
a hull with a stern and a bottom,
at least a lower trim tab pivotally secured to said hull, to provide a hinge connection between said lower trim and said hull,
expansible chamber means disposed above said lower trim tab,
a fitting secured to said hull of the boat,
a rod pivotally secured to said lower trim tab and a helical spring surrounding said rod and countering the pressure present in said expansible chamber means,

a filler tube extending through said hull into said expansible chamber means adapted to increase and decrease, respectively, the pressure in said expansible chamber means,

a pump connected with said filler tube for feeding and releasing, respectively, fluid into said expansible chamber means,

said expansible chamber means comprising a flexible bag, a conduit leading said filler tube into a housing, two two-way valves disposed in said housing, said two two-way valves being in operative connection with a pump, and

switches controlling the bidirectional operation of said pump.

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3,977,350

## TANK SHIP, ESPECIALLY LIQUIFIED GAS TANK SHIP

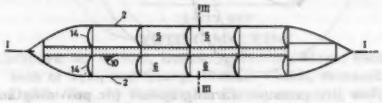
Ulrich Finsterwalder, Munich-Obermenzing, and Klemens Finsterwalder, Socking, near Starnberg, both of Germany, assignors to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Germany

Filed Dec. 5, 1974, Ser. No. 529,921

Claims priority, application Germany, Dec. 8, 1973, 2361224

Int. Cl.² B63B *5/14*

U.S. Cl. 114—74 A 3 Claims



1. A tank ship especially suited for transporting liquefied gas comprising a monolithic hull essentially rectilinear in shape but with rounded edges and comprising bottom, sides and deck formed of monolithic slabs of reinforced concrete which proceed into one another in regular curvature, said slabs being reinforced longitudinally and transversely partly by stressed and largely by non-stressed profiled steel reinforcing rods, extending continuously along substantially the entire length and breadth of said slabs, at least two longitudinally-extending interior wall means of reinforced concrete connected to the deck and bottom of said ship to provide at least two longitudinally extending tanks therein, said tanks being divided by bulkheads of reinforced concrete spaced along the length of said tanks and extending transversely of said ship to form tank chambers, said bulkheads being of such a number to provide safe floodability of said ship, said bulkheads being formed of double curved shells in the regions passing through said tank chambers, and a layer of insulation on the interior of said tank chambers.

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3,977,351

## ANCHOR

Paul Gunnar Watterback, Hornsgatan 39A, 116 49 Stockholm, Sweden

Filed July 2, 1975, Ser. No. 592,692

Claims priority, application Sweden, July 5, 1974, 7408903

Int. Cl.² B63B *21/24*

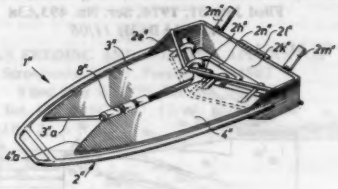
U.S. Cl. 114—208 R 5 Claims

1. An anchor, comprising:

a. a frame having a substantially planar configuration,

b. a pair of pivot members secured to the frame, said pivot members forming an angle with each other and each of said pivot members extending at an angle in relation to a median plane through the main part of the frame,

c. a pair of pointed bed engagement members individually pivotable about the pivot members between a storage position substantially in the plane of the frame and an anchoring position in which they form an acute angle to said plane, and



d. a hinge connecting the adjacent edges of said bed engagement members.

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3,977,352

## HIGH SEA VESSEL HAVING TANNING AND CARGO CARRYING CAPABILITIES

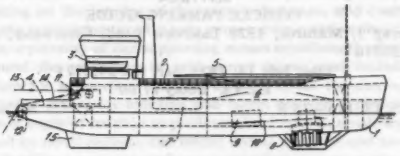
Nils Beylegaard Pran; Björn Johnsrud, and Leif Pran, all of Oslo, Norway, assignors to N.B. Pran, Oslo, Norway

Filed Nov. 21, 1974, Ser. No. 526,045

Claims priority, application Norway, Nov. 26, 1973, 4494/73

Int. Cl.² B63B *35/66*

U.S. Cl. 114—235 R 3 Claims



1. A sea going vessel, particularly adapted to serve as a supply and servicing vessel for off-shore drilling platforms through the capability of fulfilling with one ship towing, anchor handling, and load carrying functions, comprising:

an underlying hull structure,

propulsion and steering means which are positioned in and underneath the forward portion of the hull structure,

a keel fin positioned underneath the aft portion of the hull structure,

towing means positioned on the aft portion of the hull structure,

the relative positioning of propulsion and steering means, keel fin, and towing means provide enhanced maneuverability of the vessel and its towed load,

a deck house with bridge positioned in the aft portion of the vessel forward of the towing means and at a substantial distance abaft the bow and the propulsion and steering means, the positioning of said deck house providing improved protection from the seas impinging upon the bow and improved visual surveillance of all exposed decks of the vessels,

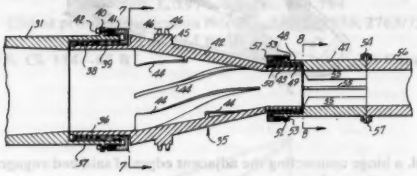
cargo carrying space positioned forward of the deck house and the towing means thereby avoiding interference between the cargo and the aft running towing cable, said cargo carrying space extending a substantial distance forward of the deck house in proportion to the length of the vessel, said cargo-carrying space comprising a weather deck wherein said weather deck is positioned at a greater elevation above the water line than the elevation of the towing means, said difference in elevation providing improved protection from the seas of the cargo loaded atop the weather deck while enhancing maneuverability by locating the towing means closer to the water line.

3,977,353

## JET POWERED MARINE PROPULSION UNIT

James Toyama, 1980 Cedar Ave., Long Beach, Calif. 90806

Filed July 31, 1974, Ser. No. 493,638
Int. Cl.² B63H *11/08*
U.S. Cl. 115—16 5 Claims



1. A jet powered marine propulsion unit comprising an elongate conduit adapted to extend in a direct straight line longitudinally through a ship from the bow to the stern thereof, a hollow conical shaped propeller mounted in said conduit intermediate the opposite ends thereof with the smallest cross section thereof extending rearwardly, a plurality of blades of elongate spiral form in said propeller extending toward the axis thereof but spaced therefrom, means mounting said propeller for rotation in said conduit and means for driving said propeller.

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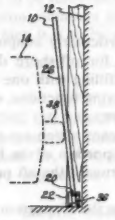
3,977,354

## VEHICLE PARKING GUIDE

Verny J. Mazurek, 1328 Lakeview Road, Clearwater, Fla. 33516

Filed July 14, 1975, Ser. No. 595,771
Int. Cl.² B60Q *11/00*
U.S. Cl. 116—28 R 6 Claims



1. A parking guide for assisting the driver of an automotive vehicle to park the vehicle in a carport or garage in close proximity with the back wall without hitting the back wall comprising an elongate member, a bracket attached to the back wall of the carport or garage, means mounting the elongate member on the bracket, for pivotal movement about a horizontal axis in a direction perpendicular to the back wall of the carport or garage and at a level below the forwardmost portion of the vehicle, with the elongate member being dimensioned to have a length to extend from the pivot to a level above the hood of the vehicle into full view of the driver as the vehicle approaches the back wall, and a stop on the bracket offset from the pivot and extending into the path of the elongate member to position the elongate member in normal position of use to extend upwardly from the pivot at an angle of inclination away from the back wall whereby the driver will be signalled by rocking movement of the elongate member about its pivot in the direction towards the back wall in response to engagement by the forwardmost portion of the vehicle during movement to park the vehicle, with the center of gravity of the rod offset from the pivot in the direction away from the back wall by an amount automatically to return the elongate member in normal position upon disengagement of the vehicle from the elongate member.

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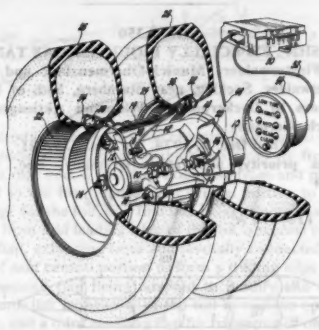
3,977,355

## LOW TIRE PRESSURE WARNING SYSTEM WITH MECHANICAL LATCHING

Edwin A. Lorenz, Flint, and Manfred P. H. Schlanzky, Alpena, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 12, 1975, Ser. No. 630,957
Int. Cl.² B60C *23/04*
U.S. Cl. 116—34 R 3 Claims



1. A low tire pressure warning system for providing and maintaining an indication of tire pressure decrease below a normal value comprising,

normally closed vlave means connected to a tire and having an inlet in communication with tire pressure, the valve having an outlet and means responsive to tire pressure for opening the valve to exhaust tire air under pressure through the outlet when tire pressure decreases below a normal value,

actuator means pneumatically connected to the outlet of said valve means including an actuator element biased to a normal position and responsive to the pressure of said tire air exhausted through the outlet for movement from the normal position to a warning position when tire pressure decreases below a normal value, and a latch mechanism responsive to movement of the actuator element to the said warning position for holding the actuator element in warning position irrespective of the continuance of the tire air pressure from the said valve outlet,

and means responsive to the actuator element in warning position to provide a low tire pressure indication.

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3,977,356

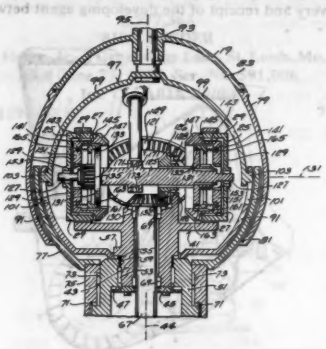
## STERN DRIVE UNIT AND TRANSMISSION THEREFOR

Raymond A. Kroll, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed May 16, 1975, Ser. No. 578,120
Int. Cl.² B63H *5/12*
U.S. Cl. 115—35 26 Claims

15. A marine propulsion device including a support adapted to be fixed to a boat hull, a cross shaft mounted by said support for rotary and axial movement relative to said support, an output gear mounted by said support for rotation in co-axial relation to said cross shaft and against movement axially relative to said support, means on said output gear and on said cross shaft for effecting common rotary movement of said cross shaft and said output gear and permitting axial movement of said cross shaft relative to said output gear, a driving member mounted by said support for rotation relative to said support by a power source and located in co-axial relation to said cross shaft, means on said driving member and on said cross shaft for selectively coupling said driving member to said

cross shaft for common rotary movement in response to axial movement in one direction of said cross shaft, means mounted by said support and operatively engaged with said cross shaft



for selectively axially shifting said cross shaft so as thereby to rotationally couple said driving member and said cross shaft, a propeller, and means drivingly connecting said output gear to said propeller.

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**3,977,357**

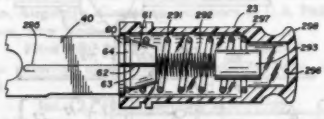
## VOTING MACHINE

**Cothburn M. O'Neal, Dallas; Alfred M. Mayo, Richardson, both of Tex., and George William Childs, deceased, late of Dallas, Tex., by Patricia M. Childs, executrix, assignors to Riverside Press, Inc., Dallas, Tex.**

**Division of Ser. No. 309,174, Nov. 24, 1972, Pat. No. 3,866,826. This application May 28, 1974, Sér. No. 473,920**

**Int. Cl.² G09F** *9/00;* **H01H** *13/04*

**U.S. Cl. 116—124 R** **8 Claims**



1. A selector for a voting machine comprising:

a depressible key member having an annular groove adjacent its outer end and defining a spring seat at its outer end;

a generally cylindrical button member associated with said key member and adapted to actuate said key member to depress same, said button member having a hollow interior with a generally transparent viewable light-diffusing end portion;

indicator means housed within said hollow interior having indicia means on a surface exposed to the interior side of said viewable end portion, said surface having light gathering characteristics;

first spring means extending between said indicator means and said spring seat for supporting said indicator means, including retainer means securing said indicator means against movement as said key and button members are depressed whereby said indicia means are spaced apart from the interior side of said end portion in a key member non-actuated position far enough to not be viewable through said light-diffusing end portion, and said indicia means are positioned in close proximity therewith in a key member actuated position so as to be viewable through said light-diffusing end portion; and

second spring means extending between said button member and said annular groove, whereby depression of said button member will move said key and button members relative to said indicia means with said indicia means in said close proximity position clearly viewable at said viewable end portion.

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**3,977,358**

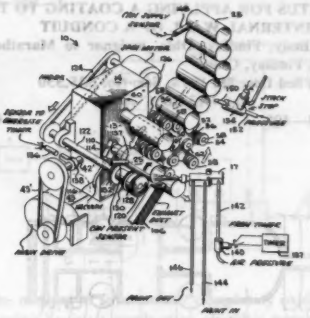
## CAN FEEDING AND COATING APPARATUS

**Alphonse Stroobants, Rte. 1, Forest, Va. 24502**

**Filed May 8, 1975, Ser. No. 575,988**

**Int. Cl.² B05C** *7/02, 11/10;* **B65G** *47/84*

**U.S. Cl. 118—2** **12 Claims**



1. Automatic can coating means for providing a liquid coating on the interior of the open-ended cans, said coating means comprising turret means mounted for rotation about an axis, a plurality of can supporting means equidistantly spaced around the periphery of said turret means and including means for supporting cans for rotation about the can axis, indexing means for indexing said turret through a predetermined angle of rotation at predetermined time intervals separated by dwell periods, can infeed means adjacent said turret for feeding a can into each can supporting station as the respective stations are positioned in proximity to said can infeed means, selectively operable spray means facing said turret in a position defining a spraying station during the dwell of successive cans carried by said turret in said spraying station, vacuum chuck means mounted in a fixed position adjacent said spraying station for attracting the end of a can in said spraying station, control means for actuating said spray means upon the detection of a can dwelling in said spraying station and spin drive means including a rotary member having friction drive means drivingly engaged with both said vacuum chuck and a can in the spraying station for rotating said vacuum chuck and the can in the spraying station at a desired speed prior to initiation of actuation of said spraying means so that said spraying means provides a uniform coating of liquid on the interior of the can in the spraying station.

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**3,977,359**

## COMPOSITE AIR-KNIFE

**Franco Bottaro, Genoa, Italy, assignor to Italsider S.p.A., Italy**

**Filed July 29, 1975, Ser. No. 600,128**

**Claims priority, application Italy, Aug. 8, 1974, 12925/74**

**Int. Cl.² B05C** *11/06*

**U.S. Cl. 118—63** **3 Claims**

1. In a coating apparatus, an improved gaseous-knife for doctoring a freshly coated web comprising:

an elongated nozzle formed of two lips inclined toward each other, one lip being substantially perpendicular to the coated web and said lips forming an angle therebetween of about 30° to 80°;

means passing a pressurized gaseous fluid through said lips to form an elongated said knife;

a slideable shutter means disposed within said nozzle, at each end thereof, whereby to adjust the effective length of the elongated slot formed by said lips;

each said shutter configured and operatively associated with one of said lips to form a narrow chamber opening at the outlet of said slot; and

means feeding a gaseous fluid through each said chamber at a higher pressure than that of said first recited means;

whereby to effect a composite gaseous-knife having higher pressures at the ends thereof for forming a more uniform coating on said web.

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**3,977,360**

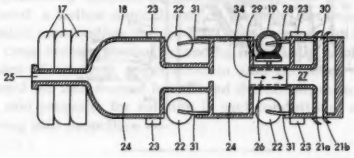
**APPARATUS FOR APPLYING A COATING TO THE INTERNAL WALL OF A CONDUIT**

**Louis C. Mihaly, Findlay, Ohio, assignor to Marathon Oil Company, Findlay, Ohio**

**Filed Dec. 23, 1974, Ser. No. 535,530**

**Int. Cl.² B05C 7/08**

**U.S. Cl. 118—408** **12 Claims**




1. An apparatus for applying a continuous layer of a liquid on the internal wall of a conduit during movement of the apparatus therethrough, comprising a housing smaller than the internal diameter of the conduit, having upstream and downstream ends relative to the movement of the housing through the conduit, and a passageway for the flow of the liquid therethrough; sealing means forming a circumferential seal between the internal wall of the conduit and the outside of the housing; pumping means in fluid communication with the passageway for pumping the liquid through the housing; drive means in frictional contact with said internal wall for driving the pumping means responsive to the rate of travel of the housing through the conduit; and applicator means in circumferential contact with said internal wall, located on the housing upstream from the sealing means, in fluid communication with the pumping means for receiving the liquid from the pumping means and applying the liquid on the internal wall of the conduit.

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**3,977,361**

**MAGNETIC BRUSH DEVELOPING DEVICE**

**Toshio Nagashima, Sagamihara; Mitsuharu Nakaguchi, Chigasoki; Takuzo Tsukamoto, Yamato; Ryuzo Okada, Azugi; Hidetoshi Kito, Kawasaki, and Kenichi Handa, Sagamihara, all of Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan**

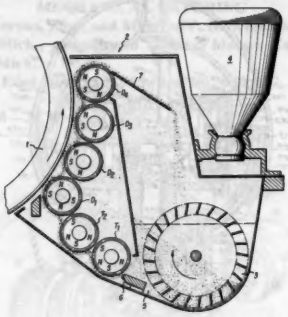
**Filed May 13, 1975, Ser. No. 576,998**

**Int. Cl.² G03G 15/09**

**U.S. Cl. 118—637** **1 Claim**

1. A magnetic brush developing device including a plurality of developing rollers each consisting of a cylindrical stationary magnet and a cylindrical sleeve rotating around said magnet, said plurality of developing rollers being disposed along the surface of a latent image forming member, wherein;

said cylindrical stationary magnets each have (a) a developing magnetic pole positioned in a portion facing the surface of latent image forming member, (b) a transporting magnetic pole positioned rearwardly of said developing magnetic pole in the travelling direction of a developing agent and having an opposite polarity to that of the developing magnetic pole, and (c) an auxiliary transporting magnetic pole positioned in a portion facing the preceding developing roller in the travelling direction of developing agent and having a polarity identical with the polarity of said transporting magnetic pole, said developing magnetic poles having the identical polarity and thus delivery and receipt of the developing agent between the



adjacent developing rollers is effected between the transporting magnetic pole of the preceding developing roller and the developing magnetic pole of the succeeding developing roller.

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**3,977,362**

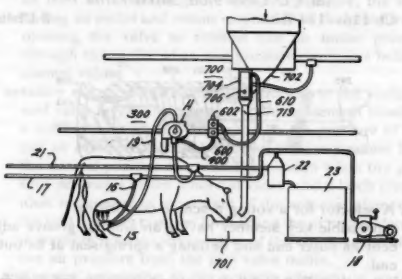
**FLUID MOVEMENT CONTROL MECHANISM**

**Burton Kent Jaquith, Fort Lauderdale, Fla., assignor to Technical Industries, Inc., Fort Lauderdale, Fla.**

**Filed Apr. 18, 1975, Ser. No. 569,297**

**Int. Cl.² A01J 5/04**

**U.S. Cl. 119—14.14** **20 Claims**




1. A fluid flow indicating device for use with a first conduit system wherein a fluid material is moved and is weighed by a continuous weighing mechanism provided with a housing and support frame therefor, and a fluid receiver mounted upon a rocker shaft, said receiver and a portion of said rocker shaft contained within said housing, and comprising (a) a magnet which is adapted to be detachably connected to said rocker shaft on that portion thereof which is outside said housing; (b) an electromechanical switch which is adapted to be mounted on said frame, said switch being in electromagnetic relationship with said magnet so that movement of said magnet can activate said switch; (c) a control module containing input and output circuits, disposed remotely from said switch and interconnected therewith by suitable electrically conductive means, said control module adapted to receive a signal from said switch through said input circuit and upon preset circuitry conditions, activate an outside electrical power supply through the said output circuit and thereby energize a motor which drives a compartmented feed delivery wheel positioned in a second conduit system, said output circuit and said motor being interconnected therewith by suitable electrically conductive means, said control module consisting of a solid state timing device which comprises a timer integrated circuit, a potentiometric section circuit which is adapted to change the length of time of the energization of said motor according to

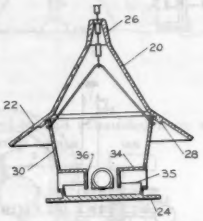
the frequency of the signal from said switch, and suitable electrically conductive means therebetween.

3,977,363

## BIRD FEEDER

James B. Fisher, Jr., 2 Graybridge Lane, St. Louis, Mo. 63124

Filed June 27, 1975, Ser. No. 591,006
Int. Cl.² A01K 39/00
U.S. Cl. 119—52 R 7 Claims



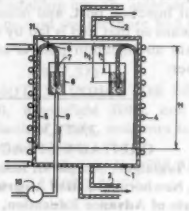

7. A bird feeder comprising a feeder housing having substantially vertical walls and a flat bottom, said vertical walls being provided with feeder holes, bird perches connected at the bottom of the housing underneath the feeder holes, a conical roof top supported on a top rim of the vertical walls, a wire handle connected with said feeder housing and receiving a chain means passing through a small opening in the roof top for attachment to a limb support or the like, said roof top resting by gravity on the top of the housing and being liftable vertically along the chain to provide access to the top of the housing for easy placement of feed therein.

3,977,364

## APPARATUS FOR EVAPORATING LIQUIDS

Josephus Cornelis Wilhelmus Franciscus Gijsbers, Eindhoven, Netherlands, and Hans Heinrich Otto Oskar Hermann Uhlemann, Augsburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 27, 1974, Ser. No. 446,147
Claims priority, application Netherlands, Mar. 6, 1973, 7303078
Int. Cl.² F28D 15/00; F22B 37/00
U.S. Cl. 122—366 10 Claims



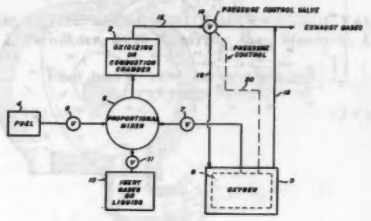
1. In an apparatus for evaporating a liquid including a housing formed by walls, heating means for heating at least one of said walls and a receptacle in said housing for containing said liquid, the improvement in combination therewith of means for distributing said liquid into a thin film to be heated on said heatable wall and evaporated, comprising: a porous layer operable with said liquid as a capillary material, said layer comprising a first upward-extending part on said wall and having upper and lower ends, a second upward-extending part spaced from the first part and having an upper end, and a lower end in said receptacle for contacting liquid therein, and a third part which is curved and interconnects said two upper ends of said first and second parts, said second part having cross-sectional area which decreases from the top end thereof at the junction with said third part downwardly toward its bottom end.

3,977,365

## METHOD OF OXIDIZING FUELS

Donald E. Vierling, 1016 Cochran Road, Pittsburgh, Pa. 15243, and Howard S. Orr, 2080 Outlook Drive, Pittsburgh, Pa. 15241

Filed Aug. 6, 1973, Ser. No. 386,211
Int. Cl.² F02B 51/00
U.S. Cl. 123—3 4 Claims



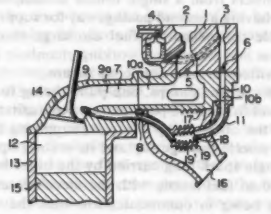

1. The method of substantially completely oxidizing a fuel in an engine having a combustion chamber which comprises adding to said fuel a mixture of oxygen, air and exhaust gases, individually controlling the flow of oxygen, air and exhaust gases, so as to provide a mixture in which the proportions by weight are between 4 and 16% oxygen, between 85 and 25% air, and between 11 and 59% exhaust gases from said combustion chamber, feeding said fuel and controlled mixture to said combustion chamber and burning the fuel and mixture therein, and continuing addition of said fuel and controlled mixture to said combustion chamber during substantially all operation of said engine.

3,977,366

## INTAKE SYSTEM OF INTERNAL COMBUSTION ENGINE

Shunzo Yamaguchi, Nishio, and Kenzi Iwamoto, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed July 23, 1974, Ser. No. 491,127
Claims priority, application Japan, July 24, 1973, 48-83813
Int. Cl.² F02M 25/06
U.S. Cl. 123—3 7 Claims



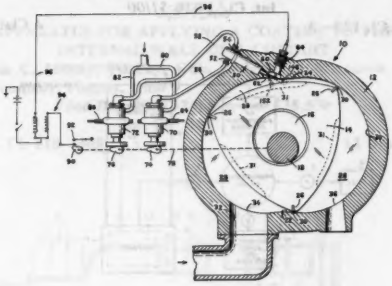

1. An intake system for intercommunicating carburetor means and combustion chamber means of internal combustion engines comprising: a cylinder head, intake port means provided in said cylinder head, intake valve means provided in said intake port means, exhaust pipe means, at least two intake passage means joined in that part of said intake port means which is immediately before said intake valve means, one of said intake passage means passing through said exhaust pipe means, and an oxidation catalyst disposed in that part of one said intake passage means which is within said exhaust pipe means.

3,977,367

## DUAL FUEL INJECTION NOZZLE

Thomas C. Roberts, Ridgewood, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Oct. 21, 1974, Ser. No. 516,758
Int. Cl.² F02B 53/10, 53/12
U.S. Cl. 123—8.09 1 Claim



1. A rotary combustion engine comprising:

a. an outer body having an internal cavity, the peripheral surface of which has a multi-lobe profile, said outer body also having an air intake passage characterized by the absence of any air throttle valve and a combustion gas exhaust passage,

b. an inner body of generally polygonal profile mounted for relative rotation within said outer body, the apex portions of said inner body having sealing cooperation with said peripheral surface to define a plurality of working chambers which vary in volume in response to said relative rotation,

c. a dual fuel nozzle for supplying fuel to the engine working chambers, said dual fuel nozzle including a nozzle body mounted in the engine outer body and having nozzle tip means for discharging fuel into the engine working chambers through a recess in the inner surface of said outer body after the air intake charge therein has been substantially compressed, said nozzle body also having a first passageway for supplying fuel to said nozzle tip means for fuel discharge through said recess into the engine working chambers from a single orifice in said nozzle tip means and having a second passageway for supplying fuel to said nozzle tip means for fuel discharge through said same recess into the engine working chambers from a plurality of orifices in said nozzle tip means,

d. a pair of fuel pumps, one pump being for supplying fuel to said first nozzle passageway and its first opening means and the other pump being for supplying fuel to said second nozzle passageway and its second opening means,

e. a single spark plug carried by the outer body adjacent to the dual fuel nozzle with the electrode end of the spark plug being in communication with the engine working chambers through the same recess in the outer body inner surface through which the dual fuel nozzle discharges with at least a portion of the fuel discharged from the single orifice of the first passageway passing in close proximity to the electrode end of the spark plug for igniting the fuel as it discharges from said single orifice, the ignited fuel discharged from said single orifice functioning as a pilot burner for igniting the fuel discharged from the plurality of orifices of said second passageway, and

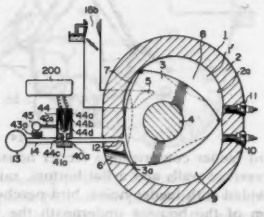
f. means for regulating the pump supplying fuel to said second passageway for varying the quantity of fuel discharged from its plurality of orifices into each working chamber so as to regulate the engine power output.

3,977,368

## ROTARY PISTON ENGINE

Shunzo Yamaguchi, Nishio; Toshihiko Igashira, Toyokawa, and Masami Hujita, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed May 15, 1974, Ser. No. 470,294
Claims priority, application Japan, May 18, 1973, 48-56138; Sept. 6, 1973, 48-104562; Sept. 18, 1973, 48-105648; Feb. 14, 1974, 49-18178
Int. Cl.² F02B 53/10
U.S. Cl. 123—8.13 7 Claims



1. A rotary piston engine comprising a housing having a trochoidal peripheral wall and side walls disposed on both sides of said peripheral wall, a rotor adapted to perform a planetary rotary motion along said peripheral wall, and intake and exhaust ports formed in said housing, said rotor having peripheral sides which define with said peripheral wall a plurality of working chambers, said planetary rotary motion of said rotor causing each of said working chambers sequentially to act as intake, compression, combustion and exhaust chambers for a working fluid, wherein an air injection port is formed in said housing between said exhaust port and the portion of said peripheral wall through which the minor axis of the trochoidal curve extends, said air injection port being so positioned in said housing as to be in communication with an intake chamber when the same is in its initial state, means for supplying air through said air injection port into said engine, fuel supply means in a passage extending between said air injection port and said air supplying means for supplying fuel to said air injection port, and means for controlling said fuel supply means so that fuel is fed by said fuel supply means only when said air injection port is communicated with an intake chamber.

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3,977,369

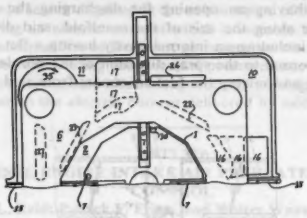
## ORBITAL DISPLACERS

Ian J. Spark, Trafalgar; Joseph M. Rossin, Glenroy, and Robert Sincich, Newborough, all of Australia, assignors to Gippsland Institute of Advance Education, Churchill, Australia

Filed July 2, 1974, Ser. No. 485,287
Claims priority, application Australia, July 2, 1973, 3904/73; Sept. 18, 1973, 4894/73; Jan. 10, 1974, 6215/74
Int. Cl.² F02B 53/08, 55/16
U.S. Cl. 123—8.43 9 Claims

1. An everted orbital displacer comprising a housing having a plurality of working cavities defined by an external peripheral wall of a stationary internal housing and opposed stationary end walls, and an internal peripheral surface of an orbiting piston, said piston being supported by three or more eccentrics so that rotation of said eccentrics is accompanied by orbital motion of said piston and a change in volume of each of said working cavities, radially disposed vanes sliding in slots in the internal housing and grooves in the end plates and slidably connected to said piston whereby orbital motion of

said piston causes said vanes to execute simple harmonic motion, and ports disposed in said outer housing to enable



fluid to be introduced to and exhausted from said working cavities as the eccentrics rotate.

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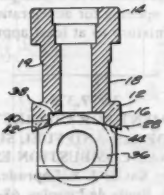
3,977,370

## ROLLER TAPPET

James W. Humphreys, Muskegon, Mich., assignor to Sealed Power Corporation, Muskegon, Mich.

Filed Oct. 23, 1974, Ser. No. 517,042
Int. Cl.² F01L 1/14
U.S. Cl. 123—90.5 7 Claims



6. A roller tappet comprising, in combination, a valve lifter body having at least a hollow end portion, a counterbore in said end portion, spaced supports extending from said end portion, surfaces on said end portion intermediate said supports, said surfaces being plunge milled and curved inwardly from said end to the interior wall thereof and connecting with said counterbore, and a roller rotatably mounted between said spaced supports and extending into the interior of said end in the clearance formed by said counterbore and surfaces.

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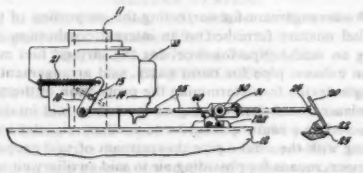
3,977,371

## THROTTLE MOTION INDICATOR DEVICE

Harry Ream Mitchell, Bloomfield Hills, and Neil Arthur Schilke, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed June 19, 1975, Ser. No. 588,332
Int. Cl.² F02D 39/00
U.S. Cl. 123—97 R 6 Claims



1. A throttle motion indicator device for an internal combustion engine having an induction system including a movable throttle for controlling flow through an induction passage and a manually actuated throttle control means, including an axial movable throttle rod, operatively connected to the throttle to effect opening movement of the throttle, said throttle motion indicator device including a leaf spring member having one end secured to the control rod for movement therewith, a detent follower secured to the opposite end of said leaf spring member, and a detent stop means adjustably fixed with respect to the engine in the path of travel of said detent follower, said detent stop means being positioned to be engaged by said detent follower upon operation of the throttle control rod effecting a predetermined opening movement of the throttle.

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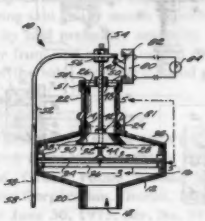
3,977,372

## CARBURETOR VACUUM SHUTOFF CONTROL VALVE

John J. Fernandez, 1620 S. Myrtle Ave., Monrovia, Calif. 91016

Filed June 6, 1975, Ser. No. 584,660
Int. Cl.² F02D 11/08
U.S. Cl. 123—97 B 13 Claims



1. A carburetor vacuum shutoff control Valve for use in a fuel system of an internal combustion engine which includes a carburetor having a main throttle valve for controlling the flow of fuel to the engine cylinders, and an intake manifold for distributing the flow of fuel from the carburetor to the engine cylinders, in which the intake manifold has a vacuum port adjacent the carburetor, and in which operation of the engine during decelerating travel of the vehicle has the potential for producing a carburetor vacuum in the intake manifold below the carburetor when the throttle valve of the carburetor is closed, the control valve comprising:

a. a valve housing having a hollow interior, a first opening to the hollow interior for communicating with the vacuum port of the intake manifold, and a second opening to the hollow interior spaced from the first opening for communicating with the atmosphere;

b. a movable valve member in the interior of the housing for opening and closing the second opening to the atmosphere; and

c. a valve positioning spring for controlling movement of the valve member between its open and closed positions, the valve positioning spring comprising an elongated snap-action bowed spring engaged with the valve member and extending through the hollow interior of the valve housing and being exposed to the first opening therein to continuously sense the carburetor vacuum present at the first opening, the bowed spring having a generally linear, non-flexed normal position to maintain the valve member normally in its closed position, the bowed spring being sensitive to the carburetor vacuum at the first valve opening increasing above a predetermined level and of itself being responsive to said increased vacuum to suddenly collapse under said vacuum and move with a snapping action from its normal position to a flexed position to consequently move the valve member to its open position away from the second opening for allowing air from the atmosphere to enter the interior of the valve housing through the first opening and pass through the second opening to the intake manifold to reduce the potential carburetor vacuum therein and replace the fuel mixture which would normally enter the intake manifold

from the carburetor, the bowed spring further being sensitive to the carburetor vacuum being reduced from said predetermined level and of itself being responsive to said vacuum reduction to snap back to its normal position and move the valve member back to its closed position to shut off the flow of air through the second valve opening.

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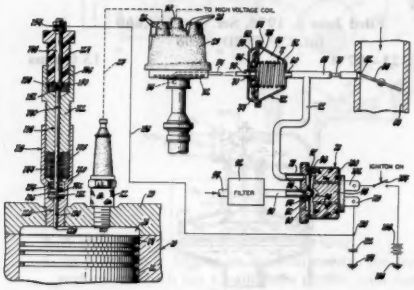
3,977,373

## CLOSED LOOP COMBUSTION PRESSURE CONTROL

Darrel R. Sand, Okemos, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 25, 1974, Ser. No. 508,981
Int. Cl.[2] F02P 5/04; F02M 25/06
U.S. Cl. 123—117 A 7 Claims




1. An internal combustion engine having a combustion chamber in which a series of combustion events occur and a closed loop combustion pressure control, said control comprising means including a transducer responsive to the pressure in said combustion chamber for creating a control signal which varies with the duration the pressure in said combustion chamber exceeds an established value and thus varies with the peak pressure in said combustion chamber, and means for regulating a combustion parameter in response to variations in said control signal and adapted to regulate said control signal and adapted to regulate said combustion parameter to decrease the peak pressure in said combustion chamber during subsequent combustion events when the peak pressure is above a selected value and to increase the peak pressure during subsequent combustion events when the peak pressure is below a selected value, said selected value being greater than said established value.

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3,977,374

## ARRANGEMENT FOR THE PREPARATION OF THE FUEL-AIR MIXTURE FOR AN INTERNAL COMBUSTION ENGINE

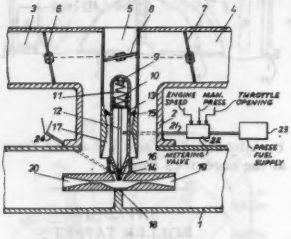
Paul August, Capellades 1, Barcelona 6, Spain

Filed May 2, 1972, Ser. No. 249,632
Int. Cl.[2] F02N 7/00, 13/00, 39/00
U.S. Cl. 123—119 R 17 Claims

1. A device for the preparation of the fuel-air mixture for an external combustion engine from sources of fuel and air, said engine being subjected to variable operating conditions including an idling condition, and having an induction manifold with an axis along which said fuel-air mixture flows, said device comprising:

a fuel-air providing means including a fuel nozzle couplable to the source of fuel for spraying a stream of finely divided fuel particles sufficient in quantity for the idling condition of the engine, said nozzle spraying the fuel stream perpendicular to the manifold flow axis, said fuel-air providing means further having air providing means couplable to the source of air and operatively associated with said nozzle for providing an idling condition air quantity coaxially contiguous with said fuel particle stream; and

discharge means connected to said fuel-air providing means and lying within said induction manifold, said discharge means having an opening for discharging the fuel-air mixture along the axis of the manifold, said discharge means including an internal cavity having a flat surface lying normal to the spray direction of the nozzle for receiving and mixing the fuel-air stream from said fuel-air




providing means, said discharge means further having an elongated passage connecting said cavity with said opening and lying parallel with the manifold flow axis, said passage having at least a converging portion providing a reduced cross sectional area in said passage between said cavity and said opening for accelerating idling quantities of the fuel-air mixture to at least approach sonic velocities.

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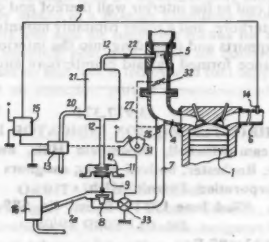
3,977,375

## ARRANGEMENT FOR CORRECTING THE PROPORTIONS OF AIR AND FUEL SUPPLIED TO AN INTERNAL COMBUSTION ENGINE

Bernard R. Laprade; Xavier J. P. Laprade, both of 64-Arudy, and Piérre J. Gelé, Route de Lourdes, 65-Odos Tarbes, all of France

Filed June 25, 1974, Ser. No. 482,881
Claims priority, application France, June 26, 1973, 73.23453; May 24, 1974, 74.18029
Int. Cl.[2] F02M 23/00
U.S. Cl. 123—119 D 21 Claims



1. An arrangement for correcting the proportion of the air and fuel mixture furnished to an internal combustion engine having an intake pipe for receiving the air and fuel mixture and an exhaust pipe for burnt gases, said arrangement comprising a device for determining the proportion of the air and fuel mixture, said device being connected to said intake pipe and including a venturi, at least one auxiliary air inlet communicating with the intake pipe downstream of said proportioning device, means for providing air to said auxiliary air inlet or inlets, at least one valve controlling said auxiliary air inlet or inlets in response to the vacuum pressure obtained at said venturi of said proportioning device, chamber means operatively connected to said venturi for receiving the vacuum pressure, said chamber means including a diaphragm con-

nected to said controlling valve and subjected to the vacuum pressure, and resilient return means for biasing said diaphragm, a sensor disposed in the exhaust pipe of the engine for delivering an electric current which is variable as a function of the composition of the burnt gases, and an electromagnetic valve for modulating the vacuum pressure received by said chamber means, said electromagnetic valve being regulated in response to the electric current delivered by said sensor.

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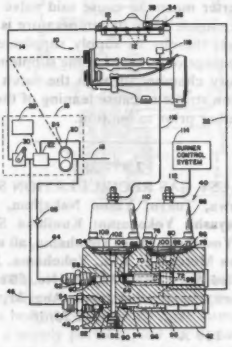
**3,977,376**

## DIESEL ENGINE INTAKE AIR PREHEATER FUEL CONTROL

**David L. Reid; Patrick F. Flynn, and Walter Wayne Eberhard, all of Columbus, Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.**

**Filed Nov. 14, 1974, Ser. No. 523,719**
**Int. Cl.² F02M *31/00***
**U.S. Cl. 123—122 G** **17 Claims**



1. In a compression ignition engine having a system including a first flow path means for supplying fuel to said engine at a pressure varying as a non linear function of engine RPM, a preheater system comprising a burner receiving intake air for said engine and a nozzle positioned in said burner for injecting fuel from a second flow path means into said burner for combustion with said air, the improvement comprising:

means interposed between and connecting said second flow path means of said fuel supply system with said nozzle for metering fuel to said nozzle at a fuel flow rate substantially linearly increasing with an increase in engine rpm over the range of normal engine operating rpm.

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**3,977,377**

## HEAT DISTRIBUTION PASSAGE FOR MANIFOLD HEATER SYSTEM

**David L. Reid, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.**

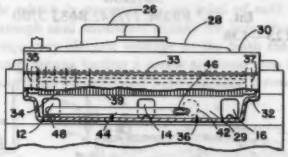
**Filed Apr. 9, 1975, Ser. No. 566,320**
**Int. Cl.² F02M *31/00***
**U.S. Cl. 123—122 G** **9 Claims**

1. In a multi-stroke air breathing internal combustion engine including at least a pair of spaced intake ports for receiving air during the intake stroke thereof at which time the pressure in said parts is lowered, said apparatus comprising:

an intake manifold for receiving intake air and distributing said air to said intake ports,

an intake air preheater assembly mounted on said manifold for substantially local heating of intake air adjacent one of said ports and remote from the other; and,

means forming a single elongated passage within said manifold and defining an inlet adjacent said preheater assembly, said inlet being positioned to permit direct distribution of heat from said preheater assembly to said adjacent port for heating a portion of the total air entering said adjacent port, said passage means extending to and defining a single outlet positioned at said remote engine intake port opening to be exposed to the reduction in pressure thereof during said intake stroke whereby a portion of the air heated by said preheater assembly is drawn through said passage from said burner to said remote port to heat a portion of the total air entering said port.



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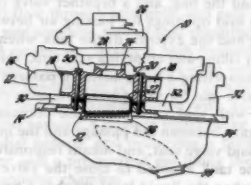
**3,977,378**

## SELF-CONTROLLED VAPOR HEAT CAPSULE FOR ENGINE INTAKE MIXTURE HEATING

**John L. Harned, Grosse Pointe Woods, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed June 30, 1975, Ser. No. 591,276**
**Int. Cl.² F02M *31/00***
**U.S. Cl. 123—122 AC** **5 Claims**



1. A vapor heat transfer capsule in combination with an internal combustion engine to transfer heat from gases in the exhaust manifold to the mixture in the intake manifold, said heat transfer capsule comprising

wall means defining a sealed enclosed chamber, said wall means including a flat upper condensing wall forming a hot plate, a flat lower evaporating wall forming a boiler surface and side walls interconnecting said upper and lower walls, said walls being of relatively low mass and said upper and lower walls being formed of thin heat conductive sheet metal,

a flange connecting with and extending outwardly from said wall means and to support said capsule within said engine manifold passage with said upper wall exposed to the intake air-fuel mixture and said lower wall exposed to the engine exhaust gases, and

a predetermined volume of heat transfer fluid within said chamber, said fluid having in the liquid state a volume of from 0.03 to 0.15 times the volume of said chamber and having a molecular weight in the range of from 100 to 500, a boiling point at atmospheric pressure in the range of from 60° to 125° C, liquid density between 1 and 2 grams per cubic cm., vapor density between 0.002 and 0.02 grams per cu. cm., liquid heat capacity between 0.8 and 2 joules per gram-degree C, heat of vaporization at the boiling point from 50 to 350 joules per gram, and said heat transfer fluid being thermally stable at temperatures below about 400° C.

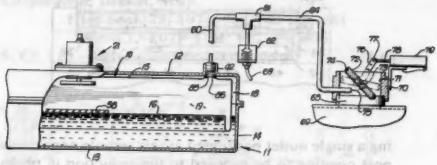
## 3,977,379
## CONTAINED VOLATILE LIQUIDS VAPOR RETENTION SYSTEM

**Joseph Weissenbach, 373 S. Hoover St., Los Angeles, Calif. 90020**

**Continuation-in-part of Ser. No. 104,079, Jan. 5, 1971, Pat. No. 3,752,355. This application Aug. 13, 1973, Ser. No. 387,958**

**Int. Cl.² F92M** *17/34*; **B65J** *3/00*

**U.S. Cl. 123—136** **7 Claims**



1. A fuel tank system for storing and dispensing a volatile fluid to a combustion engine having a conventional ignition circuit, crank case and air intake passageway to an intake manifold provided with a shut-off valve, said system comprising a tank having a top, bottom, and side walls forming a closed chamber, fill pipe and discharge means for said chamber located on said tank, a flexible bag when in operative position having a top, bottom, and side wall structure corresponding generally to the top, bottom, and side walls of the tank on the inside thereof, an opening through one of the walls of the tank separate from said fill pipe, an opening in said bag coincident with the opening in the tank, a collar around the opening in the bag comprising a seal between the respective tank wall and the bag, and a breather valve operatively associated with said openings for passing air between the interior of said bag and the exterior of the tank when volatile fluid is respectively filling and emptying said tank, said breather valve assembly comprising a body having a passage therethrough, a breather valve seat for said passage, a valve element operably associated with said valve seat and constantly open bleed passage means between the passage and the interior of the bag bypassing said valve seat, and means responsive to the level of liquid in the tank adapted to close the valve element on the valve seat when the liquid level reaches a pre-set elevation, a vapor auxiliary line having an inlet at the tank in communication with said chamber exterior of said bag and an outlet in a portion of the air intake passageway at a location downstream of said shut-off valve, said auxiliary line being clear between said inlet and said outlet, and an automatic valve actuator in operative engagement with said shut-off valve set for operation in a direction closing said valve when engine operation is discontinued and leaving the vapor auxiliary line open between the tank and said portion of the air intake passageway.

## 3,977,380
## STARTER ASSIST DEVICE FOR INTERNAL COMBUSTION ENGINES

**Minoru Atsumi; Yoshikatsu Nakano, both of Kawagoe, and Yasumichi Ohhama, Mitaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

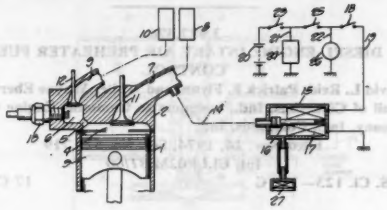
**Continuation of Ser. No. 447,239, March 1, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 612,213**

**Claims priority, application Japan, Mar. 6, 1973, 48-27285**

**Int. Cl.² F02M** *23/04*

**U.S. Cl. 123—179 G** **2 Claims**

1. A starter assist device in an internal combustion piston engine having a main combustion chamber, an auxiliary combustion chamber, a main carburetor and main intake passage to supply a lean air-fuel mixture for the main combustion chamber, an auxiliary carburetor and an auxiliary intake passage to supply a rich air-fuel mixture for the auxiliary combustion chamber, ignition means for the auxiliary combustion chamber, a torch passage communicating from the auxiliary to the main combustion chamber, and an engine starter means, said starter assist device comprising: a supplemental air supply means connected to the main intake passage but not to the auxiliary intake passage; a valve for controlling the supplemental air supply means; and a thermosensitive means exposed to engine temperatures and operatively connected to



the engine starter means to cause said valve to open during starting of the engine when its temperature is above a predetermined value, thereby to supply supplemental air to the main intake passage only, some of the supplemental air reaching the auxiliary chamber through the torch passage during the compression stroke to cause leaning of the mixture in the auxiliary chamber prior to ignition.

## 3,977,381
## EXHAUST GAS RECIRCULATION SYSTEM

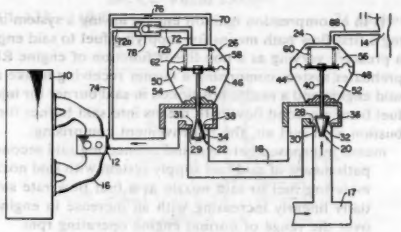
**Yasuo Fujikawa, Tokyo; Yasuo Nakajima, Yokosuka; Yoshimasa Hayashi, Yokohama; Kunihiko Sugihara, Yokohama, and Yoshifumi Hase, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Aug. 29, 1974, Ser. No. 501,849**

**Claims priority, application Japan, Aug. 31, 1973, 48-98536**

**Int. Cl.² F02M** *25/06*

**U.S. Cl. 123—119 A** **4 Claims**



1. An exhaust gas recirculation system for an internal combustion engine, comprising an exhaust gas recirculation conduit for interconnecting an exhaust conduit of an internal combustion engine and an intake manifold of said engine to recirculate exhaust gases of said engine into said intake manifold, a main exhaust gas recirculation control valve which is disposed in said recirculation conduit to meter the flow of said exhaust gases recirculated into said intake manifold and is controlled by a diaphragm unit responding to vacuum in said intake manifold and having a vacuum chamber subjected to the vacuum in said intake manifold, and an auxiliary exhaust gas recirculation control valve disposed in said recirculation conduit at a location upstream of said main recirculation control valve to meter the flow of said exhaust gases supplied thereto and operated in response to vacuum in a venturi formed in an intake conduit of said engine, said auxiliary recirculation control valve being operable to increase and reduce the flow of said exhaust gases passing therethrough in

accordance with increases and decreases in the vacuum in said venturi, respectively.

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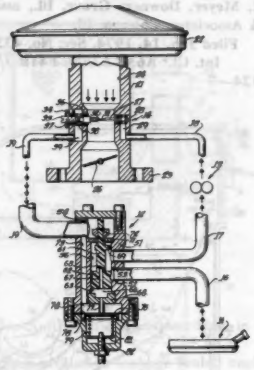
3,977,382

## FUEL REGULATOR

John J. Tuzson, Evanston, and Irving H. Hallberg, Des Plaines, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 15, 1975, Ser. No. 613,765
Int. Cl. F02m 7/12
U.S. Cl. 123—139 AW 9 Claims



1. In a fuel system including a fuel source, and charge forming apparatus arranged for recirculating excess fuel; a regulator comprising a body receiving a movable control spool; said body including a supply port adapted for connection to said fuel source, an outlet port, and a return port adapted for connection to said charge forming apparatus for receiving excess fuel therefrom; each of said ports communicating with said control spool; said spool including fluid throttling means for variably restricting flow from said return port to said outlet port in response to movement of said spool; a control chamber operatively connected with said control spool for controlling movement of said spool in accordance with pressure difference between said return port and said control chamber; pressure regulator means connected between said control chamber and said return port for charging said control chamber with fluid from said return port; and restricting means connected between said control chamber and said outlet port for exhausting fluid from said control chamber; said pressure regulator means and restricting means maintaining a selected reference pressure in said control chamber whereby said control spool regulates flow from said return port to adjust the pressure of recirculated fuel toward the value of said reference pressure.

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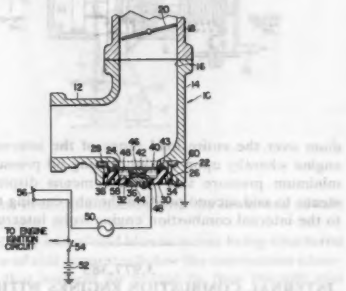
3,977,383

## ENGINE INTAKE MANIFOLD

Shinichi Nagumo, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 26, 1974, Ser. No. 527,498
Claims priority, application Japan, Nov. 30, 1973, 48-134597
Int. Cl.² F02M 29/00
U.S. Cl. 123—141 1 Claim

1. An engine intake manifold comprising a riser the bottom wall of which is made of an electrically conductive material which is grounded and has an opening and an enlarged bore aligned with said opening, said opening and said enlarged bore defining therebetween a shoulder facing outwardly from the manifold, said enlarged bore being tapped; a threaded plug made of an electrically insulating material screwed into said enlarged bore, said plug having a depression to define a bank therearound and a hole in the bottom of said recess, said bank having at least one radial passage; a diaphragm made of a piezoelectric material fastened between said shoulder and said bank to confine gas flow through said opening, said diaphragm having a side which is opposed to an inlet of said riser and grounded through said shoulder; means for selectively applying a high frequency electric voltage to the both sides of said diaphragm, said means having a screw screwed into said hole, a terminal, and a spring retained between said screw and said




terminal to urge said terminal against the opposite side of said diaphragm to establish an electric connection between said screw and said opposite side of said diaphragm, said screw confining a fluid flow through said hole, and said screw, said depression and said opposite side of said diaphragm defining a chamber, said means also having a high frequency electric oscillator circuited in series with said screw; an annular chamber formed in the bottom wall of said riser around said bank of said plug and fluidly communicating with said chamber through said radial passage; a damper liquid filling said chamber and said radial passage and occupying a portion of said annular chamber; and a pressurized gas filling the remaining portion of said annular chamber.

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3,977,384

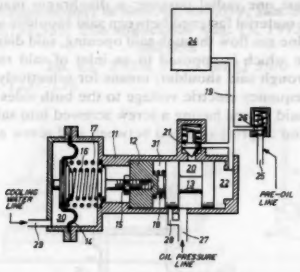
## INTERNAL COMBUSTION ENGINE OIL PRESSURE LOSS SAFETY DEVICE

Günter Jahn, Friedrichshafen, Germany, assignor to Motoren- und Turbinen-union Friedrichshafen GmbH, Germany

Continuation of Ser. No. 273,157, July 19, 1972, abandoned. This application Apr. 15, 1974, Ser. No. 461,114
Claims priority, application Germany, July 31, 1971, 2138494
Int. Cl.² F02B 77/00
U.S. Cl. 123—198 DB 9 Claims

1. An internal combustion engine arrangement including a liquid-cooling system, lubricating oil system, a fuel supply, and means for interrupting the fuel supply when the pressure of the lubricating oil system drops below a minimum lubricating oil pressure corresponding to the prevailing load of the internal combustion engine, said interrupting means comprising: a first means operatively connected with the lubricating oil system and acted upon by the lubricating oil pressure, said first means being selectively displaceable from a first to a second position in response to the lubricating oil pressure corresponding to the prevailing load of the engine dropping below the predetermined minimum, a second flexible means operatively connected with the liquid cooling system and said first means, said flexible means being responsive to the pressure of the cooling medium of the liquid cooling system as a function of rotational speed for measuring magnitude repre-

sentative of the load of the internal combustion engine, and means operatively connected with said first means and said second flexible means for compensating the pressure differential of said oil pressure and said pressure of the cooling me-




dium over the entire load range of the internal combustion engine whereby upon the lubricating oil pressure reaching a minimum pressure said flexible means displaces said first means to said second position thereby causing the fuel supply to the internal combustion engine to be interrupted.

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**3,977,385**

## INTERNAL COMBUSTION ENGINES WITH STRAIGHT LINE REINFORCING MEMBERS BETWEEN CYLINDER HEADS AND MAIN BEARINGS

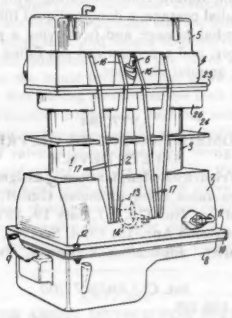
**Wilfred Percival Mansfield, Chandlers Ford, England, assignor to National Research Development Corporation, London, England**

**Filed June 12, 1974, Ser. No. 478,886**

**Claims priority, application United Kingdom, June 21, 1973, 29500/73**

**Int. Cl.[2] F02F** *7/00*

**U.S. Cl. 123—195 R** **7 Claims**



1. An internal combustion engine structure comprising:
a crankshaft;
a plurality of cylinders;
pistons arranged to reciprocate within said cylinders and impart drive to said crankshaft;
the axes of said cylinders being offset from each other in the direction of the axis of said crankshaft, so as to each lie in a different transverse plane relative to said crankshaft axis;
a cylinder head surmounting each of said cylinders, and each forming the head of a combustion zone for that cylinder;
main bearings supporting said crankshaft and located in transverse planes relative to said crankshaft axis and intermediate those of the axes of said cylinders;
reinforcement members each extending in a straight line and joining said cylinder heads to said main bearings in a straight line, whereby to withstand the tendency of the engine firing forces to separate them; and
said reinforcement members being connected to said cylinder heads at locations corresponding closely with said transverse planes of the said cylinder axes, and to said bearings at locations corresponding closely with their own transverse planes, whereby each reinforcing member lies oblique relative to said transverse planes.

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**3,977,386**

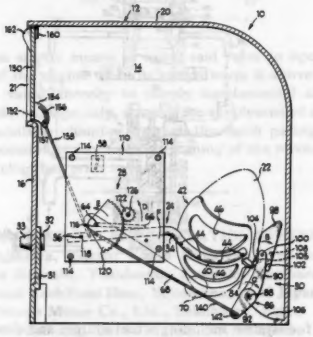
## FOOTBALL LAUNCHING APPARATUS

**Burton C. Meyer, Downers Grove, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.**

**Filed Jan. 14, 1974, Ser. No. 433,211**

**Int. Cl.[2] A63B** *67/00*; **F41B** *3/02*

**U.S. Cl. 124—7** **8 Claims**



4. A throwing device for a football having a generally ellipsoidal shape with an enlarged mid-portion converging toward opposite ends defining its longitudinal axis, comprising: a base structure, a catapult arm pivotally mounted on said base structure, drive means for rapidly pivoting said catapult arm relative to said base structure for launching purposes, and a ball holder mounted on the free swinging end of said catapult arm for receiving the football to cradle the same when the launching mechanism is at a starting rest position, the ball holder being in the form of an avoid surface segment of an ellipsoid for engaging said football when received therein for imparting a spin to the football generally about its longitudinal axis through said opposite ends thereof when launched by said mechanism, said ball holder being oriented so that the longitudinal axis of the ellipsoidal shape of which it is an avoid surface segment is disposed at an angle of approximately 45° with respect to the plane of travel of the catapult arm as well as being canted so that its open side faces generally forwardly when the catapult arm and ball holder are in their launching position whereby a trailing edge portion along the outermost periphery of the ball holder frictionally engages the football as the football moves out of the ball holder under centrifugal force during pivoting of the catapult arm to cause the football to roll off of said trailing edge during launching whereby the football is launched in a spiral motion spinning about its longitudinal axis which intersects the vertical plane of travel at an angle of approximately 45°.

7. A football throwing device, comprising: a base structure, a launching mechanism movably mounted on said base structure and having means for receiving a football and launching the same through the air in response to movement of said launching mechanism, drive means for operating said launching mechanism, said receiving means having means engageable with said football when received therein for launching the football in response to movement of the launching mecha-

nism, and a safety interlocking mechanism operatively associated with said drive means to prevent operating said launching mechanism when a football is not received in said receiving means.

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3,977,387

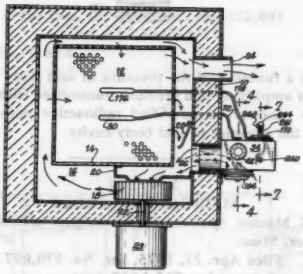
## TEMPERATURE-CONTROLLED OVEN

Joseph A. Lawler, Flossmoor, Ill., assignor to Blue M Electric Company, Blue Island, Ill.

Filed Feb. 10, 1975, Ser. No. 548,269

Int. Cl.[2] F24C *15/32*

U.S. Cl. 126—21 A 10 Claims



1. A temperature-controlled oven comprising, in combination:

a. an outer thermal-insulation leakage sealed enclosure,

b. an inner chamber within the enclosure adapted to receive bodies to be maintained at constant temperature and having gas inlet and gas outlet portions,

c. gas recirculation means within the enclosure adjacent to the inner chamber including a constant speed gas blower and gas duct means guiding outlet gas from the chamber back to the inlet portion, said gas blower constituting a heat source for said oven,

d. a source of gas exterior of the emclosure at constant temperature different than the inner chamber,

e. a gas inlet vent and a gas outlet vent through the enclosure in regions of differing internal gas pressure, said inlet vent communicating with the source of gas and continuously blending gas from the source into the gas duct means for recirculating gas within the enclosure,

f. a first control means on at least one of said vents responsive to the oven temperature to vary the rate of blending of gas from the source of gas to the gas duct means, and

g. a second control means on at least one of said vents responsive to a threshold temperature within the inner chamber to couple the inner chamber to the source of gas for blending gas from the source with gas in the inner chamber at a rate greater than the blending rate of gas from the source established by the first control means.

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3,977,388

## HEATING APPARATUS

Jacobus Christiaan Breedveld, Dinxperlo, Netherlands, assignor to N. V. Vulcaansoord IJzergieterij en Emailleerfabrieken, Terborg, Netherlands

Filed Nov. 15, 1974, Ser. No. 524,155

Claims priority, application Netherlands, Dec. 14, 1973, 7317145

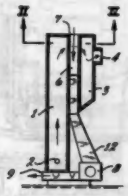
Int. Cl.[2] F24H *3/10*

U.S. Cl. 126—110 R 4 Claims

1. In a heating apparatus including a combustion chamber with a gas burner arranged in its lower part, a juxtaposed, spaced discharge chamber connected to a combustion chamber discharge duct, and a connecting duct interconnecting the upper parts of said chambers, wherein at least a portion of the walls of said chambers serve as heat exchange surfaces contacting ambient air to be heated, the improvement comprising:

vertical ambient air channel means positioned between at least a portion of said chambers,

said channel means being defined by the spaced walls of said chambers and including an upper air intake end and a lower air discharge end,



blower means in communication with the lower end of said channel means, and

said air discharge end of said blower means being structured at the base of said apparatus below the combustion chamber such that ambient air heated by flow through said channel in contact with the walls of said chambers is discharged substantially horizontally along the floor of the space to be heated.

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3,977,389

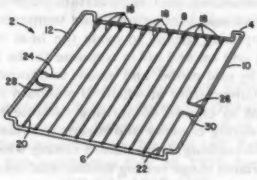
## RACK CONSTRAINING APPARATUS

Vladimir J. Ondrasik, II, 17044 Westbury Drive, Granada Hills, Calif. 91344

Filed Apr. 16, 1975, Ser. No. 565,366

Int. Cl.[2] F24C *15/16*

U.S. Cl. 126—337 R 3 Claims

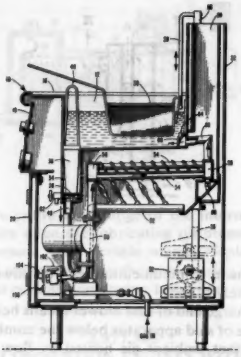


1. An improved rack of the type having a rack frame rectangular in shape with a front end, a rear end, a left side, and a right side which is supported in a host enclosure by a pair of longitudinal ribs, a left rib and a right rib, where the left side of the rack frame rests on top of the left rib and the right side of the rack frame rests on top of the right rib, and a plurality of body wires each of which is attached at one end to the front of the rack frame and at the other end to the rear of the rack frame, wherein the improvement comprises: a means for constraining the rack frame to the longitudinal ribs by a left holding device which binds the left rib between the left side of the rack frame and the left-most body wire, and a right holding device which binds the right rib between the right side of the rack frame and the right-most body wire.

## 3,977,390
## HEATED OIL COOKING APPARATUS FOR COMESTIBLES

**Joel D. Fogel, and Dennis R. Headberg, both of Miami, Fla., assignors to Burger King Corporation, Miami, Fla.**

**Filed Nov. 7, 1974, Ser. No. 521,792**
**Int. Cl.² A47J 27/14**
**U.S. Cl. 126—374** **5 Claims**



1. Apparatus for cooking comestibles immersed in a heated cooking oil comprising:
an upwardly opening cooking pot having a cooking oil inlet and an outlet,
an oil circulating pipe connected between said outlet and said cooking oil inlet to the pot, said pipe having pump means and a heating unit disposed along its length to circulate cooking oil from said outlet through a filter chamber disposed between said outlet and said oil circulating pipe to said inlet and to heat the circulating cooking oil,
a temperature sensing probe mounted to sense the cooking oil temperature,
a temperature controller,
means connecting said temperature controller to said probe and said heating unit, said temperature controller comprising means to cycle the heat input of said heating unit on and off in response to the temperature sensed by said probe, and means to choose a predetermined temperature at which to maintain said oil,
said means to choose comprising variable range setting means during cooking and means to maintain a fixed, low, non-cooking, temperature setting which overrides said variable range setting means, said means to maintain said low temperature being connected to said means to cycle said heating unit on and off.

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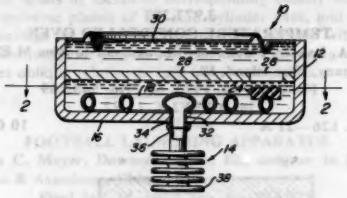
## 3,977,391
## PRESSURE SENSOR APPARATUS

**Lewis Fleischmann, Randallstown, Md., assignor to Hittman Corporation, Columbia, Md.**

**Filed July 16, 1974, Ser. No. 488,971**
**Int. Cl.² A61B 5/00**
**U.S. Cl. 128—2 A** **15 Claims**

1. A pressure sensor for monitoring the pressure in a body cavity comprising, in combination, a housing, a radioactive source disposed within said housing, radiation shielding means associated with said housing, pressure gauge means for positioning said radioactive source and said radiation shielding means in a shielding relationship, pressure responsive means communicating with said housing interior for sensing the pressure in a body cavity, said pressure responsive means being arranged to transmit the pressure in said body cavity to said housing interior to change said shielding relationship between said radioactive source and said radiation shielding



means as a function of the pressure in said body cavity and means for amplifying said pressure transmitted from said body cavity to produce an amplified radioactive output proportional to the pressure in said body cavity.

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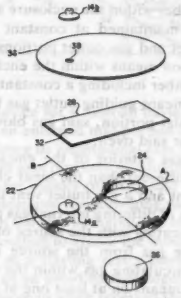
## 3,977,392
## MEDICAL ELECTRODE

**Arthur G. Manley, Andover, Mass., assignor to Eastprint, Inc., Andover, Mass.**

**Filed Apr. 21, 1975, Ser. No. 570,097**
**Int. Cl.² A61B 5/04**
**U.S. Cl. 128—2.1 E** **11 Claims**



1. A medical monitoring electrode comprising
A. a flexible support layer having a first surface and a second surface,
B. an adhesive applied to the first surface,
C. a contact element supported by the support layer and exposed at the second surface, said contact element comprising
1. a conductive snap fastener stud, and
2. a conductive snap fastener eyelet press-fit into the stud,
D. a flexible conductive gel pad
1. supported by the support layer at a location thereon spaced across the layer an appreciable distance from the contact element, so that said gel pad is not in physical contact with the contact element, and
2. having respective end portions exposed at the first and second surfaces of the support layer,
E. an electrical conductor
1. supported by the second surface of the support layer, and
2. extending between the contact element and the gel pad forming a conductive path between the two, and

F. a thin flexible nonporous cover sheet
1. adhered to the second surface of the support layer,
2. covering the conductor and the end portion of the gel pad exposed at said second surface, and
3. having an access opening through which said contact element protrudes so that electrical connection can be made thereto.

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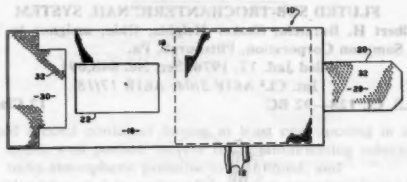
## 3,977,393
## PRESSURE CUFF AND METHOD OF PLACING IT ON A LIMB

Victor E. Kovacic, 33076 Lakeshore Blvd., Eastlake, Ohio 44094

Filed Dec. 18, 1974, Ser. No. 532,891
Int. Cl.² A61B 5/02
U.S. Cl. 128—2.05 C 6 Claims



1. A sphygmomanometer cuff having a bladder inflatable by inflating means and being adapted to be positioned around the limb of a body by pulling on opposite sides of the cuff comprising:

inflating means;

a flexible band-type member having a rectangular body with a bladder connected to said inflating means located on one surface therealong, said band-type member being adapted to be wrapped around the limb with the bladder located in the area of a vein of the limb;

a tab member formed at one end of the band-type member;

said band-type member having an aperture formed at the end of the rectangular body opposite said tab member, said aperture being spaced from said opposite end of the band-type member to leave an end grasping area between the aperture and said end, said tab member being of a size to allow its threading through the aperture to allow said band-type member to be tightly positioned around the limb without being circumferentially shifted thereon by pulling said threaded tab member in one direction and the end grasping area of said opposite end of said band-type member in a second direction opposite said first direction to tighten said cuff around the limb without shifting the bladder from the vein of the limb;

first locking means located on a surface of said band-type member opposite the bladder area;

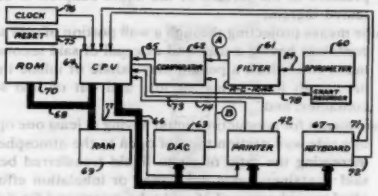
second locking means located on said tab on the same surface as said bladder; and

a third locking means located on said grasping area on the same surface as said bladder, said second locking means of said tab and said third locking means of said end grasping area of the band-type member being of a type which is individually lockable to said first locking means to retain the cuff tightly on the limb and prevent circumferential shifting thereon.

## 3,977,394
## COMPUTERIZED PULMONARY ANALYZER

William C. Jones, Elmhurst, Ill., and Clifford Harwood, Kalamazoo, Mich., assignors to Jones Medical Instrument Company, Oak Brook, Ill.

Filed Feb. 7, 1975, Ser. No. 548,093
Int. Cl.² A61B 5/08
U.S. Cl. 128—2.07 16 Claims




1. A self-contained, portable system for measuring and computing respiratory parameters of a test subject undergoing forced expired breathing maneuvers according to instructions, comprising: transducer means including spirometer means receiving the exhaled breath of the subject for generating a measurement signal representative of the volume of gas exhaled by said subject during a predetermined forced breathing maneuver; miniaturized digital computer means including clock circuit means for generating timing signals, said computer means receiving said measurement signal for acquiring and storing digital signals representing a stored record of said forced maneuver, in timed relation with said timing signals and for computing predetermined respiratory parameters of said subject from said stored signals; keyboard means comprising a plurality of digit key means selectively actuatable by an operator and communicating with said computer means for entering data relating to said particular subject, and a plurality of function key means for controlling the acquisition of said stored record of a forced breathing maneuver from said spirometer means in timed relation with said timing signals, and for communicating with said computer means for controlling the sequence of operation and computation of said system; and record generating means including printer means for printing alpha-numeric characters on a paper tape under control of said computer means to generate indicia representative of the computed parameter results selected by the operator through said keyboard means, and for communicating to said operator the progress of the sequence of said operations of said system under control of said computer means.

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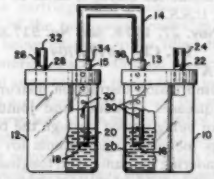
## 3,977,395
## COMBINATION INHALATION AND EXHALATION RESPIRATORY THERAPY DEVICE

Peter Nelson Brawn, 36 Fairfield St., Pittsfield, Mass. 01201

Continuation-in-part of Ser. No. 446,165, Feb. 27, 1974, abandoned. This application Feb. 20, 1975, Ser. No. 551,501
Int. Cl.² A61B 5/08
U.S. Cl. 128—2.08 13 Claims



1. A combination inhalation and exhalation respiratory therapy device for use with liquid comprising:

first and second closed containers for holding liquid;

means connecting said first and second containers for conducting liquid between said containers, said means having first and second open ends projecting into said first and second containers respectively to substantially the bottoms thereof;

said first container having at least one opening in an upper wall portion thereof for communicating atmospheric pressure to the surface of the liquid adapted to be contained therein;

tube means projecting through a wall portion of said second container having a user end external of said second container into which a person may exhale or inhale through his mouth for moving air into and out of said second container; and

said means for conducting liquid having at least one opening in a side wall portion thereof open to the atmosphere for increasing the ratio of air to liquid transferred between said containers upon exhalation or inhalation effort applied to said user end of said tube means and for decreasing resistance effects of said conducting means to transfer of liquid.

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**3,977,396**

## APPARATUS FOR TREATING VASCULAR OEDEMATA

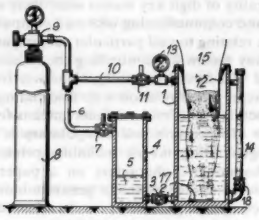
**Claude Julien Cartier, 11, rue Bourdillon, Chateauroux (Indre), France**

**Filed Apr. 11, 1975, Ser. No. 567,132**

**Claims priority, application France, Apr. 17, 1974, 74.13279**

**Int. Cl.² A61H 9/00**

**U.S. Cl. 128—65** **15 Claims**



**1.** Apparatus for treating vascular oedemata of limbs comprising a tub adapted for the vertical immersion of the bad limb in a quantity of mercury having a high static pressure gradient provided within said tub, and means for applying a gaseous fluid under pressure to the surface of the mercury to selectively increase the pressures prevailing within the mercury at different levels thereof, as a function of the clinical characteristics of the oedema to be treated.

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**3,977,397**

## SURGICAL COMPRESSION-DISTRACTION INSTRUMENT

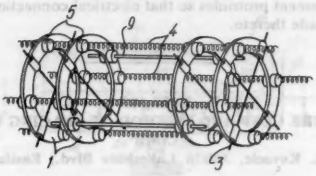
**Viktor Konstantinovich Kalnberz, ulitsa Stendera, 13, kv. 2, and Alexandr Nikolaevich Sinitsyn, ulitsa K. Marxa, 70, kv. 1, both of Riga, U.S.S.R.**

**Filed Nov. 27, 1974, Ser. No. 527,865**

**Int. Cl.² A61F 5/04**

**U.S. Cl. 128—92 A** **10 Claims**

**1.** A surgical compression-distraction instrument for treating injuries and diseases of bones and joints, comprising: needles adapted for being passed through the bone fragments being joined; rings including attachments for fastening said needles and for rendering the same taut; longitudinal members interconnecting said individual rings to form a single frame with the bone fragments disposed in required positions relative to each other; said longitudinal members being constituted as cylindrical coil springs acting on said rings to maintain same in an elastic state and provide for a constant level of elastic compression of the bone fragments whose union is to



be achieved, and adjusting nuts connecting said coil springs to said rings to permit angular and axial adjustment of said rings relative to one another by virtue of the elasticity of the coil springs connecting said rings.

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**3,977,398**

## FLUTED SUB-TROCHANTERIC NAIL SYSTEM

**Albert H. Burstein, Shaker Heights, Ohio, assignor to The Sampson Corporation, Pittsburgh, Pa.**

**Filed Jan. 12, 1976, Ser. No. 648,091**

**Int. Cl.² A61F 5/04; A61B 17/18**

**U.S. Cl. 128—92 BC** **12 Claims**

**1.** A sub-trochanteric intramedullary rod for fracture fixation of long bones comprising an elongated generally cylindrical rod member having a major distal portion and a minor proximal portion, said proximal portion having a diameter greater than the distal portion, a plurality of longitudinal flutes spaced about the periphery of each of said portions, the flutes on said major portion terminating in sharp cutting points which extend beyond said portion.

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**3,977,399**

## POSITIVE PRESSURE AND VOLUME MEASURE RESPIRATORY DEVICE

**Peter Nelson Brawn, 36 Fairfield St., Pittsfield, Mass. 01201**

**Continuation-in-part of Ser. No. 476,699, June 5, 1974, abandoned. This application Apr. 15, 1975, Ser. No. 568,378**

**Int. Cl.² A61B 5/08**

**U.S. Cl. 128—2.08** **8 Claims**

**1.** A positive pressure and volume measurement respiratory device for use with liquid comprising:

a first container for holding liquid,

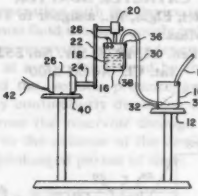
a second container for holding liquid,

flexible tubing means for connecting the interior of said first container to the interior of said second container, the open ends of said flexible tubing means being positioned

substantially near the bottom of each respective container,

means operatively connected to at least one of said containers for raising and lowering said one container higher and lower than, respectively, the other container,

a user tube affixed to an upper wall portion of said first container and communicating with the interior of said first container, said tube adapted to fit in the user's mouth,




said second container having at least one opening in an upper wall portion thereof for communicating substantially atmospheric pressure to said liquid, and

said raising and lowering means being operative to cycle said second container alternatively between positions respectively higher and lower than said first container to effect transfer of liquid between said containers thereby effecting a positive pressure at said user tube during transfer of liquid from said second container to said first container and a negative pressure at said user tube during transfer of liquid from said first container to said second container.

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**3,977,400**

**CATHETER PLACEMENT UNIT WITH RESILIENT SLEEVE AND MANUAL SLEEVE CLOSURE**

**Harvey Robert Moorehead, Salt Lake City, Utah, assignor to Deseret Pharmaceutical Co., Inc., Sandy, Utah**

**Filed Nov. 29, 1974, Ser. No. 528,072**
**Int. Cl.² A61M 5/00**
**U.S. Cl. 128—214.4** **4 Claims**

1. A catheter assembly comprising:

a catheter tube having an axial bore;

elongated piercing means coaxially disposed through and extending beyond the leading end of the axial bore of the catheter tube;

a female hub on the trailing end of the catheter tube;

a resilient sleeve member disposed within the female hub and having a bore therethrough through which the piercing means contiguously passes prior to venipuncture;

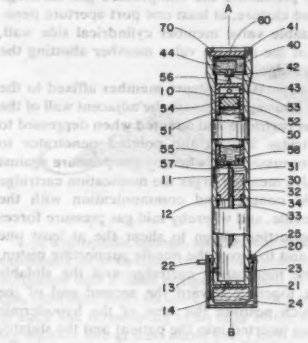
mechanical means disposed on the female hub in radial alignment with the site where the piercing means and the resilient sleeve member are contiguous, the mechanical means comprising movable means and opposed pressure applying means associated with the said hub and resilient sleeve number whereby selective movement of the movable means manually repositions the pressure applying means, before or after venipuncture and removal of the piercing means, to constrict the resilient member at said site to fully occlude any passageway in the resilient member at said site thereby preventing fluid leakage across the resilient member and opposed locking means retaining the movable means in said occluding position.

**3,977,401**

**INJECTION APPARATUS**

**William Floyd Pike, 609 W. Iron, Hobbs, N. Mex. 88240**

**Filed Mar. 25, 1975, Ser. No. 559,961**
**Int. Cl.² A61M 5/00**
**U.S. Cl. 128—218 D** **4 Claims**




1. A disposable automatically operated hypodermic syringe for injecting medication into a patient comprising:

a. a unitary elongated tubular housing having a first end and a second end, said housing first end having a cylindrical shaped relief in the inner wall thereof extending from the end of the housing to a shoulder formed by the unrelieved adjacent portion of the housing, and the second end of the tubular housing being the injecting end and being provided with a transverse end wall having a centrally located axial aperture therethrough, air escape port means penetrating the side wall of the housing proximate the said second end;

b. a hypodermic needle supporting piston slidably supported in an intermediate portion of said housing, a hypodermic needle axially supported in and hermetically affixed to the needle supporting piston, and having a sharpened end protruding from a first face of the needle supporting piston in the direction of the first end of the housing, and an elongated stem with sharpened end projecting from a second face of the needle supporting piston in the direction of the second end of the housing, at least one shearable tab affixed to the inner wall of the housing to abut against the second face of the needle supporting piston to maintain the elongated stem of the hypodermic needle retracted within said tubular housing until said syringe is operated,

c. an elongated hollow medication cartridge slidably supported in said tubular housing adjacent to and upstream of the needle supporting piston in the direction of the first end of the tubular housing, said medication cartridge having a puncturable transverse end closure in proximity to the needle sharpened end protruding from the first face of the needle supporting piston and a transverse end wall with an aperture therethrough affixed to its other end, a medication cartridge piston slidably supported inside the medication cartridge and positioned adjacent the said other end of the medication cartridge, said medication cartridge being adapted to be filled throughout its remaining interior space with fluid medication;

d. an internal annular valve recess in the interior wall of said housing at a position distant from the internal surface of the transverse wall at the second end of the housing equal approximately to the combined axial lengths of the needle supporting piston and the medication cartridge,

e. a compressed gas cartridge slidably supported in hermetically sealed relation in the housing first end relief, an annular axially compressable spring member supported in said relief between the compressed gas cartridge and the

shoulder of the relief, said compressed gas cartridge having a puncturable end closure facing the interior of the housing,

f. a cylindrical slidable valve member having a transverse substantially rigid end closure facing the compressed gas cartridge, a pointed penetrator affixed to the end closure with the point proximate the compressed gas cartridge puncturable end closure, at least one port aperture penetrating the slidable valve member cylindrical side wall, the open end of the slidable valve member abutting the medication cartridge,

g. a disc shaped depressible closure member affixed to the first end of the housing proximate the adjacent wall of the compressed gas cartridge and adapted when depressed to force the cartridge against the pointed penetrator to release the compressed gas, whereby gas pressure against the slidable valve member urges the medication cartridge into rupturable contact and communication with the hypodermic needle, and whereby said gas pressure forces the needle supporting piston to shear the at least one retaining tab, and to move the needle supporting piston, the needle, the medication cartridge and the slidable valve member together toward the second end of the housing at which position the stem of the hypodermic needle has been inserted into the patient and the slidable valve member is in the internal annular recess in the housing, whereby gas pressure passes into the interior of the slidable valve member and into the medication cartridge to force the medication piston along the length of the medication cartridge thereby injecting the medication into the patient.

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**3,977,402**

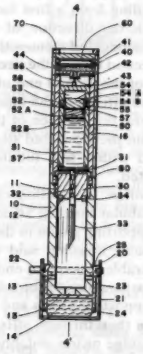
## INJECTION APPARATUS AND METHOD WITH AUTOMATIC ASPIRATION FEATURE

**William Floyd Pike, 609 W. Iron, Hobbs, N. Mex. 88240**

**Continuation-in-part of Ser. No. 559,961, March 25, 1975. This application July 14, 1975, Ser. No. 593,771**

**Int. Cl.² A61M** *5/00*; **128** *218 D;218 A;218 F;218 R;218 DA;215;216;225;220;221;173;213;276*

**U.S. Cl. 128—218 D** **8 Claims**



**1. An intramuscular injection system comprising:**

a. housing means

b. needle means in said housing mounted for linear movement in a first direction from a retracted position in the housing to a position protruding forwardly out of said housing,

c. linearly movable chemical medication chamber means in said housing having a rupturable portion in alignment with said needle means such that said needle means will rupture said medication chamber means upon selective relative movement of said needle and medication chamber means,

d. fluid propulsion means adapted to effect said selective relative movement of said needle means and medication chamber means and to effect linear movement of said needle means between said retracted and protruding positions, and

e. aspirating means for automatically creating a partial vacuum in said medication chamber means after said needle has been moved into its protruding position.

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**3,977,403**

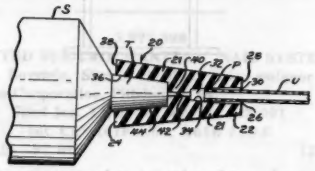
## CATHETER ADAPTER

**Bhupendra C. Patel, Elgin, Ill., assignor to The Kendall Company, Boston, Mass.**

**Filed Feb. 24, 1975, Ser. No. 552,028**

**Int. Cl.² A61M** *5/00*

**U.S. Cl. 128—221** **16 Claims**



**1. An adapter assembly, comprising:**

a syringe having a tip;

a catheter; and

a flexible body member having first opening means to receive an end of the catheter, means for sealingly engaging said catheter end, a port to receive and sealingly engage the syringe tip, and a wall portion separating the first opening means and said port, with said wall portion having normally closed slit means extending through the wall portion between the first openinng means and said port, said port having an internal size sufficiently less than the outer size of the syringe tip such that the syringe tip expands the body member and opens the slit means when the syringe tip is inserted into the port to establish communication between the syringe tip and the catheter, said body member contracting and the slit means closing responsive to removal of the syringe tip from the body member.

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**3,977,404**

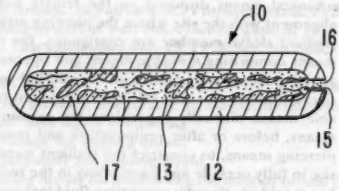
## OSMOTIC DEVICE HAVING MICROPOROUS RESERVOIR

**Felix Theeuwes, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.**

**Filed Sept. 8, 1975, Ser. No. 611,504**

**Int. Cl.² A61M** *31/00*

**U.S. Cl. 128—260** **38 Claims**



**1. An osmotic device for the continuous dispensing of an active agent to an environment of use, said device comprising:**

a. a shaped wall formed of a semipermeable material that maintains its integrity during the dispensing period and is characterized as permeable to the passage of an external fluid in the environment of use and substantially impermeable to the passage of the active agent with the wall surrounding in at least a part;

b. a reservoir formed of a material having a plurality of micropores with the reservoir containing an active agent that is soluble in the external fluid and exhibits an osmotic pressure gradient across the wall against the fluid;

c. a passageway for dispensing agent from the device, said passageway consisting of at least one micropore that communicates with the reservoir and the exterior of the device; and

d. wherein in operation with the device in the environment of use, external fluid is continuously imbibed through the wall into the reservoir in a tendency towards osmotic equilibrium at a rate determined by the permeability of the wall and the osmotic pressure gradient across the wall, thereby continuously dissolving the agent which is dispensed from the reservoir through the microporous passageway to the exterior of the device at a controlled rate over a prolonged period of time.

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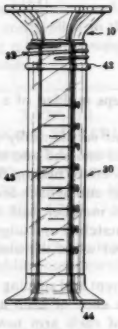
**3,977,405**

## BREAST PUMP

**Shozaburo Yanase, 2-20, Tsurigane-cho, Higashi, Osaka, Japan**

**Filed Apr. 7, 1975, Ser. No. 565,670**
**Int. Cl.² A61M 1/06**
**U.S. Cl. 128—281** **3 Claims**



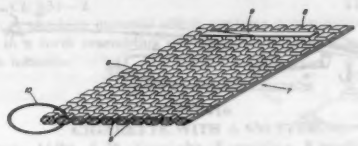

1. A breast pump comprising an inner cylinder, an outer cylinder, a packing mounted on the outside of said inner cylinder and adapted to seal up a clearance between said inner and outer cylinders, and a stabilizing ring, said inner cylinder having two open ends, one end being divergent so as to be put against a breast and the other end being inserted into said outer cylinder and displaced therein, the outer diameter of said inner cylinder being smaller than the inner diameter of said outer cylinder to permit said displacement of said inner cylinder in said outer cylinder, said outer cylinder being a container with an open end and a closed end, at least one channel being provided over the whole periphery of the outside surface of said inner cylinder into which said packing is removably fitted, said stabilizing ring being mounted on the inside surface of said divergent portion of said inner cylinder for stabilizing a teat.

**3,977,406**

## MEDICAL SPONGES

**Roy William Roth, New Canaan, Conn., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed June 19, 1974, Ser. No. 480,643**
**Int. Cl.² A61F 13/00**
**U.S. Cl. 128—296** **6 Claims**



1. A hydrophilic sponge, adapted for medical use, consisting essentially of a flexible, texturized, polyurethane foam sheet embossed with a fused design composed of a series of continuous, unbroken lines no more than about 1 inch apart, each end of each line terminating at an edge of the sheet and intersecting another line at least about every inch in each direction, the thickness of the area of said design being from about 25 to about 95 percent of the original thickness of said foam sheet, the remaining area being of the original thickness, substantially all of the reticulated cells at the surface of said sheet being broken.

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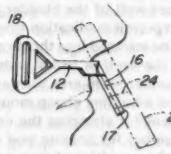
**3,977,407**

## NASOTRACHEAL TUBE HOLDER

**Steven J. Coleman, Marlboro, and James W. O'Brien, Waltham, both of Mass., assignors to Thermo Electron Corporation, Waltham, Mass.**

**Filed Sept. 3, 1974, Ser. No. 503,010**
**Int. Cl.² A61M 25/00**
**U.S. Cl. 128—348** **1 Claim**

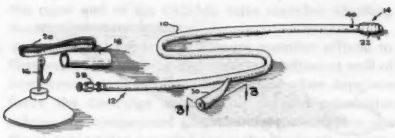



1. A one-piece holder for securing a nasotracheal tube in its applied working position comprising an elongated, flattened strip of a width not greater than the space between the nasal opening and the upper lip for lying on the face of a subject just beneath the nasal opening having an integrally formed elongated projection extending from a central portion thereof at an acute angle with respect thereto to align said projection with a nasal passage of a subject when the holder is in its working position and means adjacent each end of said strip adapted to lie on opposite cheeks of the subject for attaching to a head encircling band, said projection forming a shallow trough therealong for mounting such nasotracheal tube in longitudinal alignment therewith, said projection being adapted to receive an adhesive binding means wrapped around both such nasotracheal tube and said projection to firmly bind together said projection and such tube, and tab means extending from the end of said projection for inhibiting any tendency of said binding means to slide off said projection.

## 3,977,408
## PROSTHETIC CATHETER

Allan H. MacKew, 1634 Willow Drive, Sandusky, Ohio 44870

Filed Nov. 1, 1974, Ser. No. 520,854
Int. Cl.[2] A61M 25/00
U.S. Cl. 128—349 B 1 Claim



1. A system for enabling the injection of liquid into the prostate comprising a catheter consisting of an elongated tubular member having an external end and an insertion end formed of flexible material of sufficient rigidity and a sufficiently small outer diameter to enable insertion along the length of the male urethra through the cystourethral junction into the bladder, inflatable balloon means adjacent the insertion end of said elongated tubular member capable of inflation to a size sufficiently large to prevent removal of said balloon means from the bladder, an inflation enabling conduit extending along the length of said elongated tubular member and having an inner end communicating with the interior of said balloon means and an outer end connectable to a source of gas for enabling inflation of said balloon means, a medication providing conduit also extending along the length of said elongated tubular member, medication dispensing duct means in said tubular member communicating with the insertion end of said medication providing conduit, said medication dispensing duct being spaced outwardly along the length of said tubular member a distance from said balloon means so as to be positioned adjacent the area of the prostate in which the prostatic ducts are located when said balloon is in place and engaged with the inner wall of the bladder adjacent the cystourethral junction to permit medication from said medication providing conduit to be injected into the prostate, penis clamp means for clamping the urethra to the outer surface of said elongated tubular member in an area outwardly of said medication duct means and a holding clamp mounted on a support spaced from the patient for clamping the external end of the elongated tubular member for holding said elongated tubular member in tension when positioned in a patient to maintain said balloon in position in forceful engagement with the inner wall of the patient's bladder with sufficient force to permit medication to be injected in the portion of the urethra between the balloon and the penis clamp means at sufficient pressure to enable flow of the medication into the prostate via the prostatic ducts.

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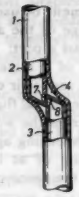
## 3,977,409
## TUBE VALVE

Lennart Ingvar Brendling, Axvagen 81, S-175 44 Jarfalla, Sweden

Filed Apr. 4, 1975, Ser. No. 565,300
Claims priority, application Sweden, Apr. 8, 1974, 7404708
Int. Cl.[2] A61M 25/00
U.S. Cl. 128—349 R 7 Claims

1. A tube valve, particularly intended for incorporation in a catheter tube, characterized in that said valve comprises two valve bodies inserted in the tube, said bodies filling the cross-sectional area of said tube and each of said bodies being provided with at least one through opening which, in the closed position of the valve in which the two bodies are in coaxial alignment with one another, is closed by the tube or by the other body but can be exposed by elastic deformation



of the tube whilst simultaneously displacing said bodies out of said coaxial alignment.

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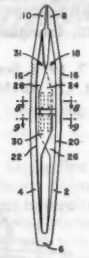
## 3,977,410
## DISPOSABLE FORCEPS

Paul O. Huston, Montville, N.J., and John O. Freeborn, New Fairfield, Conn., assignors to International Paper Company, New York, N.Y.

Filed Feb. 13, 1975, Ser. No. 549,695
Int. Cl.[2] A61B 17/30; B25B 9/02
U.S. Cl. 128—354 8 Claims



3. Disposable forceps molded of a single piece of resilient material comprising:

a. First and second substantially parallel arms integrally joined together at one end and having a spring-like resiliency in order to effect biasing the arms toward an open position, the other end of each arm having a jaw member;

b. teeth on each jaw member, said teeth of one jaw member being precisely matched and aligned with the teeth of the other jaw member when the arms are urged to a closed position; and

c. combined alignment and spacing means integrally formed intermediate the ends of each arm and projecting from the inner wall of each arm toward the other arm and comprising (i) a first longitudinal web projecting from the inner wall of the first arm toward the inner wall of the second arm, (ii) a second longitudinal web projecting from the inner wall of the second arm toward the inner wall of the first arm, said first and second webs interfacing and engaging each other, and each having an outer peripheral edge abutting the inner wall of the opposite arm when the arms are urged to a closed position, and wherein said first web includes at least one first nodule projecting inwardly toward the second web, and said second web includes at least one second nodule projecting inwardly toward the first web, said first nodule travelling along said second web and said second nodule travelling along said first web during operation of the forceps for allowing movement of said first and second arms in only one planar direction to the open and closed position, and said first nodule engaging said second nodule when the arms are in the open position for limiting the maximum distance between said first and second arms when the arms are biased to an open position, said alignment and spacing

means thereby ensuring proper alignment and matching of said teeth.

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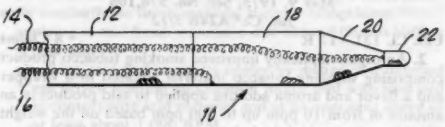
3,977,411

## CARDIAC PACER SYSTEM AND METHOD

Howard C. Hughes, Jr., Cornwall; Robert R. Brownlee, State College, and G. Frank O. Tyers, Hershey, all of Pa., assignors to Research Corporation, New York, N.Y.

Filed June 12, 1975, Ser. No. 586,169
Int. Cl.² A61N 1/36
U.S. Cl. 128—419 P 9 Claims




1. A system for use in a cardiac pacer of the type having control means for receiving an input signal representing cardiac activity and for producing a control signal in accordance therewith, and pulse generating means responsive to said control signal for generating artificial heart stimulating pulses for application to the heart, which system comprises:

first electrode means for sensing cardiac activity, operatively connectable to said control means to provide an input signal representing cardiac activity thereto and having a large contact area to enhance sensitivity to cardiac activity;

second electrode means of substantially smaller contact area than said first electrode means, operatively connectable to said pulse generating means, for receiving said artificial heart stimulating pulses from said pulse generating means and applying said pulses to the heart tissue, said second electrode means generating a high current density at its electrode-tissue interface when said artificial stimulating pulses are applied to the heart; and

electrically insulating means for supporting said electrodes in a spaced relationship.

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3,977,412

## SMOKING MATERIALS

Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Mar. 20, 1975, Ser. No. 560,021
Int. Cl.² A24B 15/00
U.S. Cl. 131—2 11 Claims

1. A smoking material which contains comminuted puffed triticale in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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3,977,413

## SMOKING MATERIALS

Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Mar. 20, 1975, Ser. No. 560,022
Int. Cl.² A24B 15/00
U.S. Cl. 131—2 11 Claims

1. A smoking material which contains comminuted puffed barley in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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3,977,414

## SMOKING MATERIALS

Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Mar. 20, 1975, Ser. No. 560,023
Int. Cl.² A24B 15/00
U.S. Cl. 131—2 11 Claims

1. A smoking material which contains comminuted puffed oats in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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3,977,415

## SMOKING COMPOSITIONS

Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Mar. 20, 1975, Ser. No. 560,024
Int. Cl.² A24B 15/00
U.S. Cl. 131—2 11 Claims

1. A smoking material which contains comminuted puffed rye in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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3,977,416

## CIGARETTE WITH A SNUFFER

Minoru Akiba, 5-28, Yasui-cho, Kagoshima, Kagoshima, Japan

Filed Sept. 18, 1974, Ser. No. 507,222
Claims priority, application Japan, Sept. 22, 1973, 48-111307
Int. Cl.² A24D 1/10, 1/12
U.S. Cl. 131—4 A 7 Claims

1. A cigarette with a snuffer, which comprises, in combination:

a. a tobacco-filled cylindrical, open-ended paper enveloped cigarette portion having an end that is adapted to be lit;

b. at least one cylindrical smoke-filtering portion removably attached adjacent the end of said cigarette portion that is opposite to the end that is adapted to be lit; and

c. an extinguishing sleeve made of a material that is non-combustible at the temperature of the lit portion of the cigarette when the cigarette is burning, said sleeve being secured to the said filtering portion and having a tubular, cylindrical extension defining a cavity projecting toward and normally encasing the end of said cigarette portion that is not lit, said extension cavity of said sleeve receiving therein the lit end of said cigarette portion when it is desired to extinguish the cigarette, said extinguishing sleeve further including:

1. a layer of a non-combustible material coated on at least a portion of the inner surface of said cylindrical extension.

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3,977,417

## SMOKING ARTICLE AND PROCESS FOR FILTERING TOBACCO SMOKE EMPLOYING A CROSS-LINKED ORGANIC OIL FILTER MATERIAL

Charles B. Hoelzel; Norman B. Rainer, and Peter Allen Wilson, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Mar. 23, 1973, Ser. No. 344,419
Int. Cl.² A24B 15/02
U.S. Cl. 131—10.9 11 Claims

9. A filter material for tobacco smoke comprising a particulate solidified organic oil having a particle size of from about 20 to about 200 mesh U.S. Sieve Series and up to about 20 weight percent based on said vegetable oil of a powder selected from at least one member of the group consisting of an inorganic powder and an organic powder, said powder being hydrophilic and having a particle size of from about 1 to about

100 microns where said solidified organic oil has a Shore A hardness of from about 10 to about 100 and an elongation of less than about 200% and which have the capacity to absorb sufficient amounts of organic liquids to expand from 3 to 20 times in volume.

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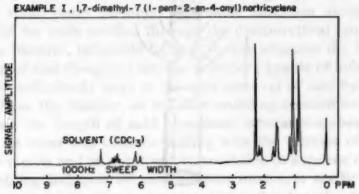
3,977,418

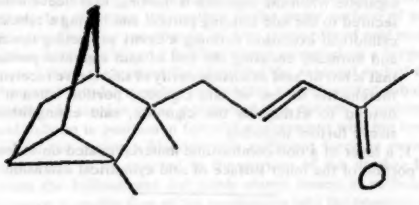
## TOBACCO ARTICLE COMPRISING THE FLAVORING COMPOSITION TRICYCLENE-9-BUTENONE AND THE PROCESS FOR MAKING THE SAME

Joaquin Francisco Vinals, Red Bank; Manfred Hugo Vock, Locust; Braja Dulal Mookherjee, Matawan, and Venkatesh Kamath, Red Bank, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Mar. 10, 1975, Ser. No. 556,873
Int. Cl.² A24B 3/12
U.S. Cl. 131—17 R 3 Claims


EXAMPLE I, 1,7-dimethyl-7 (1-pent-2-en-4-onyl) nortricyclene
SIGNAL AMPLITUDE
SOLVENT ($CDCl_3$)
1000Hz SWEEP WIDTH
10 9 8 7 6 5 4 3 2 1 0 PPM

1. A process for altering the organoleptic properties of tobacco comprising the step of adding to tobacco, homogenized tobacco containing a flavoring composition comprising tricyclene-9-butenone having the structure:



and at least one tobacco flavoring additive selected from the group consisting of:

Esters;
Pyrones;
Aldehydes;
Ketones;
Acetals;
Natural oils and extracts;
Lactones;
Ethers;
Pyrazines; and
Pyrroles

The amount of said tricyclene-9-butenone in said combined tobacco and homogenized tobacco being from 100 up to 5000 parts per million based on the combined weight of said homogenized tobacco and said tobacco.

3,977,419

## TOBACCO ARTICLE COMPRISING A FLAVORING COMPOSITION SELECTED FROM BUTANONE DERIVATIVES AND THE PROCESS FOR MAKING THE SAME

Braja Dulal Mookherjee, Matawan; Robert Walter Trenkle, Bricktown; Manfred Hugo Vock, Locust, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 462,748, April 22, 1974, Pat. No. 3,928,645, which is a continuation-in-part of Ser. No. 386,320, Aug. 7, 1973, Pat. No. 3,872,031. This application May 9, 1975, Ser. No. 576,106
Int. Cl.² A24B 3/12
U.S. Cl. 131—17 R 8 Claims

2. An organoleptically improved smoking tobacco product comprising smoking tobacco material encased in a wrapper and a flavor and aroma additive applied to said product in an amount of from 10 ppm up to 500 ppm based on the weight of said product, which includes as an active ingredient at least one ketone compound selected from the group consisting of 4-(2,6,6-trimethyl-1,3-cyclohexadien-1-yl)-2-butanone and 4-(6,6-dimethyl-2-methylene-3-cyclohexen-1-yl)-2-butanone.

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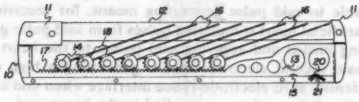
3,977,420

## RETRACTABLE COMB

Stanley A. Yalof, 7605 Convoy Court, San Diego, Calif. 92111

Filed Sept. 15, 1975, Ser. No. 613,105
Int. Cl.² A45D 1/00
U.S. Cl. 132—11 R 3 Claims



1. A retractable comb comprising:

a sheath member having first and second walls defining a hollow space therebetween, and having a slot in the top portion thereof dimensioned for receiving metallic comb tines;

a plurality of pinion gears rotatably carried between said first and second walls of said sheath member;

a rack member slidably received and carried by said sheath member, said rack member having a plurality of gear teeth engaged with said plurality of pinion gears; and

a plurality of tines, each of said plurality of tines being fixedly attached to a different one of said pinion gears.

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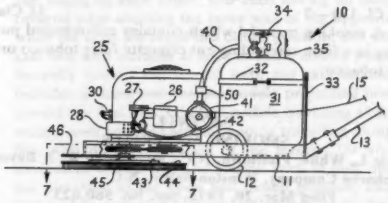
3,977,421

## BUFFING MACHINE

Burke R. Fallen, 166 Santa Clara Ave., Oakland, Calif. 94610

Filed Apr. 19, 1973, Ser. No. 352,613
Int. Cl.² A47L 11/162
U.S. Cl. 134—6 2 Claims



1. A buffing machine for polishing floors having a hard, nominally non-buffable finish thereon comprising:

a wheel mounted support adapted for movement over the floor surface to be buffed;

a disc-shaped fibrous buffing pad mounted on said support for rotation about the center of said pad and in floor surface engaging position;

an internal combustion motor mounted on said support and connected for rotationally driving said pad at an operating speed of up to at least about 1,000 RPM, said motor being fueled by liquid gas;

a liquid gas fuel tank carried by said support; and

a valve and fuel supply line connecting said tank and motor for controlling the operation of said motor.

2. A method of polishing indoor floors having a hard, nominally non-buffable finish material thereon comprising:

applying to said finish material a disc-shaped fibrous buffing pad; and

revolving said pad about its center by means of a liquified gas driven internal combustion motor and with said pad in contact with said material and at an operating speed of at least about 1,000 RPM.

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## 3,977,422

## CONCEALED LITTER BAG CANE DEVICE

**Wenceslao Cabaluna, Chateaugay, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed May 1, 1975, Ser. No. 573,457**
**Int. Cl.² A45B *3/00***
**U.S. Cl. 135—66** **1 Claim**

1. A concealed litter bag cane device, comprising

a hollow cane having a handle at one end thereof and an opening at the other end thereof;

a piston in the cane;

a substantially rigid wire extending from the piston to the area of the open end of the cane;

a substantially flexible wire affixed at one end to the free end of the rigid wire and affixed at the other end to the cane adjacent the opening thereof;

a litter bag mounted on the flexible wire; and

ejecting means in the cane in the area of the handle for moving the piston toward the open end of the cane thereby moving the flexible wire out of the cane through the open end thereof, said flexible wire forming a loop and supporting the litter bag in open condition outside the cane.

said ejecting means comprises a container of gas in the cane on the opposite side of the piston from the rigid wire and trigger means extending outside the case for releasing gas from the container; and gas release means for releasing gas from the cane and a spring in the cane extending between the opposite side of the piston from the rigid wire and the handle end of the cane for drawing the flexible wire back into the cane after the gas is released from the cane.

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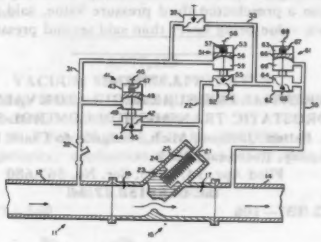
## 3,977,423

## VALVE CONTROL APPARATUS AND METHOD

**Hadwen A. Clayton, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Mar. 14, 1975, Ser. No. 558,272**
**Int. Cl.² F16K *17/22***
**U.S. Cl. 137—12** **10 Claims**



1. Apparatus for controlling the flow of fluid through a main conduit means, said apparatus comprising:

a valve means for controlling flow through said main conduit, said valve means comprising

an upstream inlet portion,

a downstream outlet portion,

a valve element adapted to vary the restriction to flow from said upstream inlet portion to said downstream outlet portion, and

pilot pressure inlet means for applying fluid pressure to said valve element to exert a closing force on said valve element;

first conduit means, in fluid communication with said upstream inlet portion of said valve means, for providing a source of fluid pressure responsive to the fluid pressure within said upstream inlet portion;

second conduit means, in fluid communication with said downstream outlet portion of said valve means, for providing a source of fluid pressure responsive to the fluid pressure within said downstream outlet portion;

flow restriction means for providing a predetermined degree of communication between said first conduit means and a third conduit means;

first pilot valve means for controlling fluid communication between said second conduit means and said third conduit means in response to the fluid pressure within said second conduit means;

second pilot valve means for controlling fluid communication between said third conduit means and said pilot pressure inlet means in response to the fluid pressure within said first conduit means; and

third pilot valve means for controlling fluid communication between said pilot pressure inlet means and a low fluid pressure source in response to the fluid pressure within said first conduit means, said low fluid pressure source having a fluid pressure which is less than the fluid pressure within said second conduit means.

8. A method for operating a valve means having an upstream inlet, a downstream outlet, and a fluid-actuated closure mechanism associated therewith to control the flow of fluid through said valve means, said method comprising:

establishing a first fluid pressure signal responsive to the fluid pressure within said upstream inlet of said valve means;

establishing a second fluid pressure signal responsive to the fluid pressure within said downstream outlet of said valve means;

automatically applying said first fluid pressure signal to said closure mechanism when said second fluid pressure signal exceeds a preselected first pressure value;

automatically applying said second fluid pressure signal to said closure mechanism when said first fluid pressure signal is within a preselected range between said first pressure value and a preselected second pressure value, said second pressure value being lower than said first pressure value; and

automatically reducing the pressure applied to said closure mechanism to a value lower than said second fluid pressure signal when said first fluid pressure signal is lower than a preselected third pressure value, said third pressure value being lower than said second pressure value.

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**3,977,424**

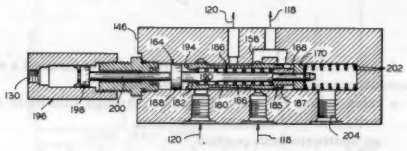
## DIFFERENTIAL PRESSURE REGULATOR VALVE FOR A HYDROSTATIC TRANSMISSION CONTROL SYSTEM

**Jon R. Patton, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.**

**Filed Apr. 14, 1975, Ser. No. 567,680**

**Int. Cl.² F15B *13/04***

**U.S. Cl. 137—106** **14 Claims**




1. A differential pressure regulator valve comprising:

a. an elongated body having a longitudinally extending bore therein, first pressure inlet and outlet ports in said body which communicate with said bore, second pressure inlet and outlet ports in said body which also communicate with said bore and are longitudinally spaced from said first inlet and outlet ports, an annular first groove in said body and in communication with both said second pressure inlet and outlet ports;

b. a spool assembly slidably disposed in said bore, said assembly including an inner spool member actuatable between a first position and a second position, said inner spool member having a flange portion and a rod portion, an outer spool member having a longitudinally extending bore and an inwardly projecting portion therein through which said rod portion freely extends, an annular second groove in the outer periphery thereof and a passage connecting said second groove and said second-mentioned bore, said outer spool member being operable to alternately connect, via said second annular groove, said first inlet port with said first outlet port and said second inlet port with said first outlet port, said outer spool member also having an annular end portion and an associated reduced diameter step portion in the outer periphery thereof longitudinally spaced from said second groove, said body also having a conduit, one end of which merges into said second pressure outlet port and the other end of which merges into said first-mentioned bore so as to connect said second outlet port with at least said outer spool member reduced diameter step portion;

c. a seal member fixed to the end of said rod portion opposite said flange portion and in sealing relationship with said first-mentioned bore;

d. a spring retainer sleeve carried by said rod portion and disposed adjacent said seal member, said retainer being in sealable slidable relationship with second-mentioned bore;

e. a regulating spring disposed in said second-mentioned bore and abutting said inwardly projecting portion therein at one end and said spring retainer sleeve at the other end;

f. A return spring disposed in said first-mentioned bore for biasing said inner spool member toward said first position; and

g. means for actuating said inner spool member toward said second position against the bias of said return spring.

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**3,977,425**

## HYDRAULIC PRESSURE CONTROL VALVE

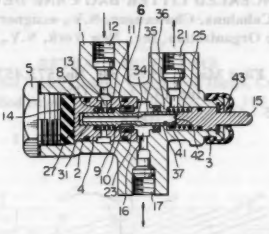
**Yoshihiro Hayashida, Chigasaki, Japan, assignor to Tokico Ltd., Kanagawa, Japan**

**Division of Ser. No. 421,640, Dec. 4, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 535,024**

**Claims priority, application Japan, Dec. 4, 1972, 47-121300; Feb. 6, 1973, 48-14904; Apr. 20, 1973, 48-44872; Apr. 20, 1973, 48-44873**

**Int. Cl.² F15B *13/14***

**U.S. Cl. 137—116.3** **1 Claim**




1. A pressure control valve comprising a housing having therein a bore having a passage extending therefrom for communicating with a source of hydraulic fluid, a control pressure chamber connected to said bore and having a passage extending therefrom for communicating with pressure actuating means, and an exhaust chamber connected to said control pressure chamber and having a passage extending therefrom for communicating with a reservoir of hydraulic fluid,

a piston slidably disposed in said bore and a fixed abutment in said bore and elastic means in said bore acting on one end of said piston for urging said piston against said fixed abutment, said piston having a supply pressure space therewithin and a radial opening communicating with said passage to said source of hydraulic fluid,

a member in said housing defining an axial opening connecting said supply pressure space to the control pressure chamber,

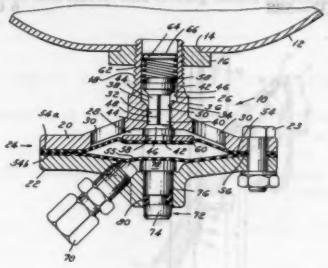
an elongated valve member extending axially of the housing within said supply pressure space and said chambers and having an axial bore extending therethrough and a valve portion on the outer circumference thereof and cooperating with the inner end of said member defining the axial opening from the supply pressure space into the control pressure chamber to form a supply valve, one end of the piston having a blind bore therein in which one end of said valve member is slidably supported, said valve member having an aperture therein opening into said axial bore from said control pressure chamber through which the hydraulic pressure in the control pressure chamber is supplied into the blind bore through the axial bore, and the other end of the valve member being slidable into the exhaust chamber, and

a manually operable push rod extending into the exhaust chamber and cooperating with the other end of the valve member to form an exhaust valve between the axial bore and the passage extending from the exhaust chamber to the reservoir for hydraulic fluid.

## 3,977,426
## CONDENSATE VALVE ASSEMBLY

**Kenneth E. Pyle, Marine City, Mich., assignor to Reef-Baker Corporation, East Detroit, Mich.**

**Filed Feb. 3, 1975, Ser. No. 546,736**
**Int. Cl.² F16K *31/126*; F16T *1/00***
**U.S. Cl. 137—204** **4 Claims**



**3.** A valve comprising a housing, a fluid passage in said housing, a valve member for controlling said passage, means supporting said valve member for movement between first and second positions, a flexible diaphragm extending across said valve member, a fluid pressure chamber defined in part by said diaphragm, said diaphragm being operative to move said valve member toward its second position in response to fluid pressure in said pressure chamber, means for moving said valve member toward its first position when the pressure in said pressure chamber is relieved, said diaphragm comprising inner and outer layers, said outer layer being on the side of said inner layer away from said pressure chamber, said inner layer having a metering aperture therethrough permitting pressure fluid in said pressure chamber to flow through said aperture between said layers and separate said inner layer from said outer layer while said outer layer holds said valve member in said second position, whereby when the pressure in said pressure chamber is relieved the movement of said valve member to its first position is delayed by the metered escape of pressure fluid from the space between said layers through said aperture.

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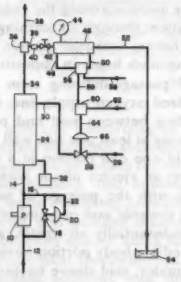
## 3,977,427
## CONTROL OF THE VISCOSITY OF FUEL OIL FOR BURNERS

**Robert D. Reed, and Harold F. Koons, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.**

**Filed Sept. 18, 1975, Ser. No. 614,691**
**Int. Cl.² F16K *19/00*, *49/00***
**U.S. Cl. 137—334** **8 Claims**



**1.** Apparatus for the control of the viscosity of fuel oil supplied to burners comprising:

a. pump means for supplying liquid fuel to a burner system under a selected pressure;

b. liquid fuel heating means through which the pressurized fuel is passed;

c. means to control the heating of said fuel, whereby the temperature of said fuel is selectively increased or decreased;

d. at the outlet of said fuel heating means, means to deliver fuel to a burner means;

e. at the outlet of said fuel heating means, bypass valve means to control the bypass of liquid fuel through an orifice of selected length and diameter;

f. differential pressure cell means connected across said orifice, and means responsive to the measured differential pressure to control said means to control the heating of said fuel.

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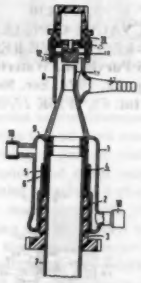
## 3,977,428
## VACUUM SEALING APPARATUS

**Ernst Schilling, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed July 20, 1975, Ser. No. 600,371**
**Claims priority, application Germany, July 30, 1974, 2436643**
**Int. Cl.² F16K *49/00***
**U.S. Cl. 137—340** **10 Claims**



**1.** Apparatus to be joined to the end of an ampule to provide sealing which can withstand a high vacuum comprising:

a. a heat resistant cylindrical threaded part disposed over the end of the ampule;

b. a threaded termination member of glass and including means for coupling to other apparatus screwed onto said heat resistant threaded part; and

c. sealing means in the form of a plurality of rings exhibiting a tongue and groove action disposed between the ampule and said termination member and arranged to be compressed as said termination member is screwed onto said heat resistant cylindrical threaded part.

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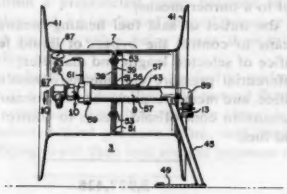
## 3,977,429
## HOSE REEL ASSEMBLY

**James S. Stevenson, 4230 St. Andrew Road, Oakland, Calif. 94605**

**Division of Ser. No. 315,295, Dec. 15, 1972, Pat. No. 3,856,274. This application Oct. 10, 1974, Ser. No. 513,867**
**Int. Cl.² B65H *75/34***
**U.S. Cl. 137—355.27** **1 Claim**

**1.** A hose reel assembly comprising a reel including a pair of bell shaped components, each comprising a cylindrical section terminating at one end in a base and at its other end in a flange, and means joining said bell shaped components base to base, a reel supporting structure including a flow passageway extending axially of said base to base bell shaped components, means for rotatably supporting said reel on said supporting structure including a sleeve about said flow pas-

sageway rotatably supporting said base to base bell shaped components on said flow passageway, a hose coupling at one end of said passageway to permit of connection to a source of liquid, and a hose coupling at the opposite end of said flow passageway for connection of a hose, that bell-shaped component proximate to said latter hose coupling, having an opening through which such hose may pass for winding upon said hose



reel, stop means on said flow passageway adjacent one end of said sleeve to help restrict said sleeve as to position on said flow passageway, and clutch means adjustably mounted on said flow passageway adjacent the opposite end of said sleeve to complete restriction of said sleeve and enable pressure engaging said sleeve between said clutch means and said stop means whereby to selectively inhibit rotation of said reel.

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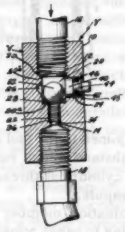
**3,977,430**

## BALL CHECK VALVE CONSTRUCTION WITH PRESSURE-RESPONSIVE RESET MEANS

**Joseph J. Bushee, 36 Purvis St., Watertown, Mass. 02172**

**Filed Aug. 22, 1974, Ser. No. 499,502**
**Int. Cl.² F16K *17/00***
**U.S. Cl. 137—460** **1 Claim**



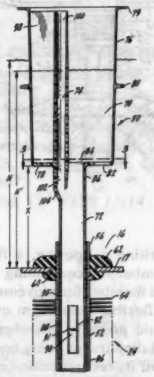
1. Safety ball check valve construction for use in controlling flow of compressed air under a normal operating pressure through a conduit line to a pressure actuated apparatus, said valve construction comprising a valve body having an inlet port and an outlet port for detachably receiving respective inlet and outlet sections, the valve body being further recessed to form a ball check chamber, a spring cavity extending therefrom, a ball member loosely contained in the chamber, a sealing ring mounted at one side of the ball chamber, spring means supported in the spring cavity inside the sealing ring in a projecting position to locate the ball in spring-biased spaced relation to the sealing ring when compressed air flow through the valve body is under normal operating pressure, and to resiliently retain the ball when it is moved into sealing relationship with the sealing ring in response to change in pressure of the compressed air, reset means for moving the ball from a sealing position into the said spring-biased spaced relationship to the ring when said normal operating pressure is in effect, and said reset means including a side wall part of the valve body formed with a cylindrical aperture and an opposite side wall section formed with a ball recess, and a plunger device for displacing the ball from a sealing position on the sealing ring into the ball recess.

**3,977,431**

## FLOW CONTROL APPARATUS

**John C. Ovard, Columbia, Md., and Joel I. Reisman, Santa Rosa, Calif., assignors to Ecodyne Corporation, Lincolnshire, Ill.**

**Filed July 1, 1974, Ser. No. 484,485**
**Int. Cl.² F16K *24/00***
**U.S. Cl. 137—588** **6 Claims**



1. A flow control nozzle for directing a liquid through the floor of a liquid containing basin; comprising:

a. a substantially vertical tubular portion having a lower end adapted to extend through the floor of said basin;

b. a chamber portion having a bottom surface in communication with an upper end of said tubular portion below the liquid level in said basin, said bottom surface having openings formed therethrough and being positioned a predetermined distance above the floor of said basin so as to permit liquid to pass therethrough into said chamber portion; and

c. an air vent tube having an upper end extending upwardly into said chamber portion and in communication with the atmosphere and a lower end in communication with said tubular portion.

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**3,977,432**

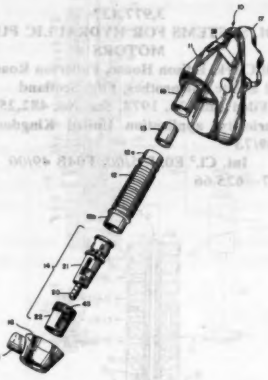
## BREATHING MASK AND VARIABLE CONCENTRATION OXYGEN DILUTING DEVICE THEREFOR

**Claude A. Vidal, Los Angeles, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.**

**Filed Jan. 13, 1975, Ser. No. 540,388**
**Int. Cl.² F16K *15/00***
**U.S. Cl. 137—604** **8 Claims**

1. A device for diluting and controlling the concentration of oxygen delivered to a patient through a breathing mask, comprising a tubular body having one end portion adapted for connection to a breathing mask hose, an opposite end portion provided with an axial passage-defining stem adapted for connection to a pressurized oxygen supply line, and an intermediate portion extending between said end portions; said intermediate portion having at least one side wall aperture and terminating adjacent said one end portion in a circumferentially-extending shoulder; an ejector nozzle within said body communicating directly with the passage of said stem and having an orifice facing towards said one end of said body; a tubular sleeve snugly, substantially air-tightly, and rotatably fitting upon said intermediate body portion having a first end engagable with said shoulder; said sleeve having at least one side aperture selectively registrable with the aperture of said body; and locking means projecting outwardly from said opposite end portion of said body for engagement with a second end of said sleeve; said shoulder and locking means preventing

axial displacement of said sleeve upon said body without restraining relative rotation of said body and sleeve; said intermediate portion of said body and said sleeve being gradually tapered at the same angle in the direction of said opposite end of said body; said intermediate portion having its outer surface snugly and substantially air-tightly engaging the inner surface of said sleeve; said locking means preventing relative



axial movement of said sleeve and said body out of said snug surface engagement; said opposite end of said body being provided with at least one continuously-open side wall aperture extending beyond said sleeve and communicating with the interior of said body to provide a minimum level of oxygen dilution during operation of said device regardless of the rotational position of said sleeve.

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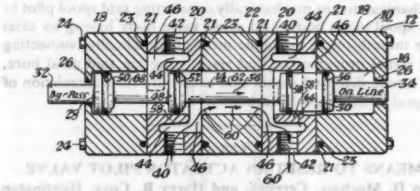
**3,977,433**

## MULTI-PURPOSE VALVE STRUCTURE

**Paul M. Hankison, Peters Township, Washington County, and William Foster Walker, Bethel Park Borough, both of Pa., assignors to Hankison Corporation**

**Filed Oct. 4, 1974, Ser. No. 512,104**
**Int. Cl.² F16K *11/07***
**U.S. Cl. 137—625.29** **17 Claims**




1. A valve structure comprising an elongated housing having passage means extending therethrough, a control member mounted in said passage means for rectilinear movement with respect to said housing, said housing having a plurality of spaced valve ports extending laterally therethrough in communication with said passage means, a plurality of sealing means non-uniformly spaced along the length of said control member for movement therewith, each of said sealing means sealingly engaging adjacent wall surfaces of said passage means, said sealing means in one position of said control member defining a given flow circuit among said valve ports, said sealing means in another position of said control member defining a different flow circuit among said valve ports, and transversely juxtaposed pairs of said valve ports communicating through respective pairs of recesses with said passage means, each pair of said recesses being defined by a pair of transversely opposed substantially circular members mounted in said housing, said circular members being axially elongated to partially define said passage means.

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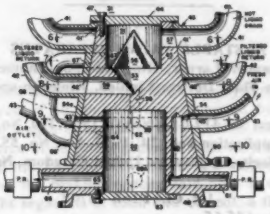
**3,977,434**

## APPARATUS FOR COOKING FOOD IN HOT NON-AQUEOUS LIQUIDS UNDER PRESSURE

**Charles Jere Albright, 919 N. Michigan Ave., Chicago, Ill. 60610; Clifford E. Fitch, Sr., and Clifford E. Fitch, Jr., both of P.O. Box 221, South Holland, Ill. 60473**

**Division of Ser. No. 367,811, June 7, 1973, Pat. No. 3,861,286, which is a division of Ser. No. 881,230, Dec. 1, 1969, Pat. No. 3,793,940. This application Jan. 16, 1975, Ser. No. 541,593**
**Int. Cl.² F16K *11/083*; A47J *37/12***
**U.S. Cl. 137—625.47** **12 Claims**



1. A rotary valve means to simultaneously control flow of a plurality of diverse fluids to and from conduit means for said diverse fluids, comprising a pair of sealingly interengaged, relatively rotatable, inner and outer valving members each having a plurality of inlet ports and a plurality of outlet ports therein, fluid passage means interiorly of said inner valving member interconnecting said inlet ports with said outlet ports in said inner valving members, different selected inlet and outlet ports in the outer valving member registering with different selected inlet and outlet ports in the inner valving member in different relative rotative positions between the inner and outer valving members to enable flow of fluid from some of said conduit means to other of said conduit means, including means to effect simultaneous control of flow of a plurality of diverse fluids through said conduit means and valve means in some of the different relative rotative positions of the valving members, and to preclude flow of at least one of the diverse fluids in other selected relative rotative positions of the valving members.

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**3,977,435**

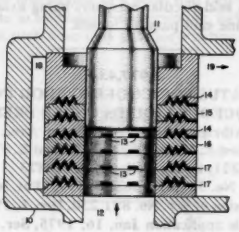
## CONTROLLED PRESSURE DROP VALVE

**Charles Bates, P.O. Box 100C, Springville, Utah 84663**

**Filed Feb. 21, 1974, Ser. No. 444,524**
**Int. Cl.² F16K *47/08***
**U.S. Cl. 137—625.3** **12 Claims**

1. A valve for high pressure fluids having a vertically actuated plunger and a valve wall coacting with said plunger to form a seal therebetween, said valve wall comprising a series of stacked annular disks, having fluid flow across said disks, an annular center opening in each disk in register with the annular openings of the remaining disks to provide a cylindrical cavity to accommodate said plunger and provide a fluid inlet, each disk having a plurality of substantially circular ridges on at least one face of said disk for changing direction of fluid flow, said ridges having a V-shaped cross-section and each disk having a plurality of projections on at least one surface of said disk to space each disk from adjacent disks and a substantial opening about the inside periphery of each disk communicating with the space between said disk and an adjacent disk

and a substantial opening about the outside periphery of each disk communicating with the space between said disk and an



adjacent disk and communicating with a discharge outlet of said valve.

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**3,977,436**

**BI-STABLE VALVE APPARATUS**

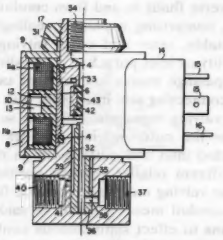
**Donald Alexander Larner, Kingston-upon-Thames, England, assignor to Fluid Devices Limited, Kingston-upon-Thames, England**

**Division of Ser. No. 412,012, Nov. 1, 1973, Pat. No. 3,889,219. This application Feb. 24, 1975, Ser. No. 552,724**

**Claims priority, application United Kingdom, Nov. 2, 1972, 50624/72**

**Int. Cl.² F16K *31/08***

**U.S. Cl. 137—625.65** **2 Claims**



1. A bistable, electromagnetically-actuated valve comprising:

a moving armature, movable between two end positions;

at least one winding for electrical energization and moving said armature;

an annular permanent magnet for providing magnetic latching;

means defining an enclosed space containing said armature, said defining means comprising tubular means and respective end wall means closing the ends of said tubular means;

a first valve orifice defined in a first said end wall means;

a bore defined in a second said end wall means;

a tube mounted in said bore and extending at least to adjacent said space, the end of said tube at least adjacent said space defining a second valve orifice, and said tube being spaced from the internal wall of said bore;

a first pressure fluid connection connected to said first valve orifice;

a second pressure fluid connection connected to said second valve orifice;

a third pressure fluid connection connected to said space around said tube and thereby to said enclosed space; and

means providing communication between said third pressure fluid connection and said first valve orifice when said armature is in said second end position; and

valve seats on each end of said armature, whereby when said armature is at a first said end position, said first valve orifice is closed and said second pressure fluid connection is connected to said third pressure fluid connection, and when the armature is at a second said end position, said second valve orifice is closed and said first pressure fluid connection is connected to said third pressure fluid connection.

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**3,977,437**

**CONTROL SYSTEMS FOR HYDRAULIC PUMPS AND MOTORS**

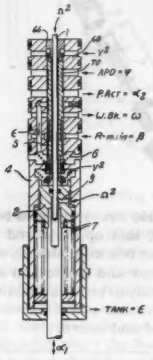
**Robert Cecil Clerk, Edison House, Fullerton Road Queensway Industrial Estate, Glenrothes, Fife, Scotland**

**Filed June 24, 1974, Ser. No. 482,259**

**Claims priority, application United Kingdom, June 22, 1973, 29689/73**

**Int. Cl.² E03B *5/00*; F04B *49/00***

**U.S. Cl. 137—625.66** **2 Claims**




1. A control valve assembly comprising a multi-input/output spool valve body, annular collector grooves disposed in predetermined locations externally of said spool valve body, input and output spool ports disposed predetermined positions in said spool valve body, radially disposed drillings in said spool valve body connecting said input and output spool ports with said annular collector grooves, sealing means for sealing adjacent collector grooves from each other, a spool pilot, a signal processor disposed within and movable within said spool pilot, mechanical means mechanically connecting said spool pilot to said spool valve body, said spool valve body having an axial bore therethrough, hydraulic means hydraulically connecting said signal processor to said spool valve via said axial bore, and a tube disposed within said axial bore for transmission of a signal to said signal processor.

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**3,977,438**

**MEANS TO RESET AN ACTUATOR PILOT VALVE**

**John D. Muchow, Cerritos, and Harry R. Cove, Huntington Beach, both of Calif., assignors to Willis Oil Tool Co., Long Beach, Calif.**

**Filed Oct. 2, 1975, Ser. No. 618,735**

**Int. Cl.² F16K *17/00***

**U.S. Cl. 137—625.66** **20 Claims**

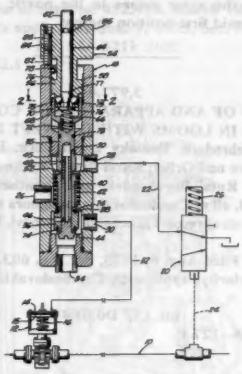
1. A reset mechanism incorporated in an actuator pilot that has a body with a valve member therein, wherein a reset operation comprises advancing the valve member manually against biasing fluid pressure from a retracted position against a first valve seat to an advanced position against a second valve seat and then holding the valve member against the second valve seat until an opposite fluid pressure rises to dominate the biasing fluid pressure to keep the valve member against the second valve seat,

comprising:

a manually operable reset actuator movable from a retracted position to force the valve member from the first valve seat to the second valve seat;

means to releasably operatively connect the valve member to the reset actuator at the retracted position of the actuator to permit advance of the actuator to advance the valve member against the second valve seat; and

means to release the advanced valve member from the advanced reset actuator when said opposite fluid pressure rises to maintain the valve member against the second valve seat by dominating said biasing fluid pressure.



## 3,977,439
## SEALING ARRANGEMENT

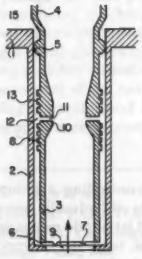
**Paul Lambert, Grenoble, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), France**

**Filed Mar. 22, 1974, Ser. No. 453,860**

**Claims priority, application France, Mar. 22, 1973, 73.10341**

**Int. Cl.² F15D *1/00***

**U.S. Cl. 138—37** **14 Claims**



1. A sealing arrangement for tubular elements in a nuclear reactor comprising:

fluid introducing support means for supporting an end portion of a tubular element and providing introduction of fluid into said tubular element,

sealing means for preventing leakage of said fluid from said fluid introducing support means, said sealing means including

a seal provided between said end portion of said tubular element and said fluid introducing support means, and

at least one orifice means for communicating an interior portion of said tubular element with an exterior position of said tubular element which is supported by said fluid introducing support means, said interior portion having a reduced cross-section.

## 3,977,440
## COMPOSITE BRAKE HOSE

**Larry R. Phillippi, Mantua, Ohio, assignor to Samuel Moore and Company, Mantua, Ohio**

**Filed May 3, 1972, Ser. No. 249,927**

**Int. Cl.² F16L *11/08***

**U.S. Cl. 138—125** **6 Claims**

1. A flexible hose connecting the brake system of a vehicle with a source of air under pressure carried by the vehicle wherein the length of the hose between the braking system and the source of air under pressure must vary in length with variations in the distance between the said source of air under pressure and the braking system, said hose having substantially straight segments at each end thereof, a fitting on one end of the hose for attaching the hose to the brake system and on the opposite end of the hose for connecting the hose to the source of air under pressure, said hose being coiled into a helical configuration which is expandable by separation of the coils and self-retracting from its expanded configuration into its coiled configuration in response to the removal of restraint, said hose comprising a core tube of crystalline-like polymeric material, a sheath of crystalline-like polymeric material, and an intermediate layer reinforcing the core tube formed of continuous strands of fibrous material helically wound in opposite directions about the core tube with adjacent convolutions of each strand in spaced relationship with each other to form open spaces therebetween, said sheath being fuse bonded to the core tube through said open spaces to form a tube wall of components locked together against relative movement.

## 3,977,441
## DEVICE FOR RECORDING WEAVING FAULTS

**Vladimir Svaty, Liberec, Czechoslovakia, assignor to Elitex, Zavody textilniho strojirenstvi generalni reditalstvi, Liberec, Czechoslovakia**

**Filed Aug. 23, 1971, Ser. No. 173,816**

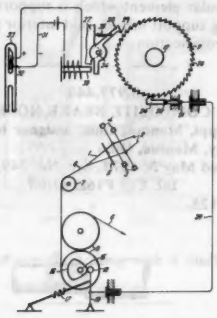
**Claims priority, application Czechoslovakia, Aug. 26, 1970, 5852-70**

**Int. Cl.² D03D *51/06***

**U.S. Cl. 139—1 R** **6 Claims**

1. Device for recording weaving faults in fabric being manufactured on weaving machines having a withdrawal cylinder by making a written record of said faults on a recording card with symbols indicating the reason for the particular weaving faults comprising drum means mounted on a threaded end of a stationary shaft, a recording card mounted circumferentially on said drum means, transmission means connected to said withdrawal cylinder and coupling said drum means thereto and which transmission means moves at the same speed as advancing fabric being manufactured on said weaving machine and comprises a cam having at least one projection and which is mounted on the shaft of the withdrawing cylinder of the weaving machine, a roller mounted on a swingable lever means and bearing against said cam and a resilient cable connected to said swingable lever at one end and to the drum

means at the opposite end, said drum means being provided with a helical, circumferential groove of the same pitch as the threaded end of said stationary shaft, writing means being



mounted opposite the helical groove of said drum means and electromagnetic means, including circuit means and switch means connecting said electromagnetic means to at least one stop motion on the stop circuit of said weaving machine.

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**3,977,442**

## FLUID PRESSURE CONTROL DEVICE FOR SHUTTLELESS WEAVING LOOM

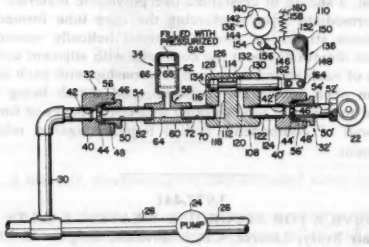
**Kazuo Shibata, Sagamihara, and Seiji Kasai, Tokyo, both of Japan, assignors to Nissan Motor Co., Ltd., Japan**

**Filed Apr. 3, 1975, Ser. No. 564,663**

**Claims priority, application Japan, Apr. 9, 1974, 49-40187; Sept. 30, 1974, 49-112425**

**Int. Cl.² D03D *47/30***

**U.S. Cl. 139—435** **16 Claims**




**1. In a shuttleless weaving-loom with a weft inserting arrangement in which a weft yarn is picked into a weaving shed of warp yarns in predetermined cycles by a jet stream of liquid shot into the shed, a device for producing a jet stream comprising, liquid supply means for continuously supplying liquid under pressure at a constant rate, a liquid discharge nozzle disposed for discharging a jet stream of liquid shot into a shed of warp yarns for picking a weft yarn therewith, means defining a passageway interconnecting the fluid supply means and the fluid discharge nozzle, valve means disposed in the passageway and having means operative to a first position for providing communication between the fluid supply means and the fluid discharge nozzle and a second position for blocking the communication therebetween, control means for actuating the valve means into the first or second position thereof in cycles synchronized with the predetermined picking cycles of the weft yarn, pressure accumulating means disposed in the passageway upstream of the valve means for accumulating therein the pressure of the liquid from the liquid supply means when the valve means is in the second position thereof and delivering the accumulated liquid pressure to the liquid discharge nozzle through the valve means when the valve means is in the first conditioning thereof, first flow restriction means disposed in the passageway upstream of the pressure accumulating means for restricting the flow of the fluid from the liquid supply means to the pressure accumulating means, and second flow restriction means disposed in said passageway between said valve means and said nozzle for restricting the flow of the liquid from the valve means to the nozzle when the valve means is in said first position thereof.**

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**3,977,443**

## METHOD OF AND APPARATUS FOR CONTROLLING PUMPS IN LOOMS WITH JET WEFT INSERTION

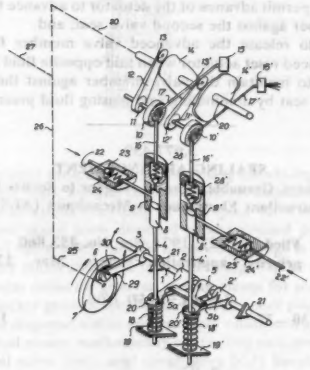
**Stanislav Zahradnik, Roztoky u Jilemnice; Hubert Svoboda, Albrechtice nad Orlici; Karel Basek, Bychnov nad Kneznou; Vladislav Ruta, Borohradek, and Frantisek Koza, Tyniste nad Orlici, all of Czechoslovakia, assignors to Elitex, Zavody textilniho strojirenstvi generalni reditalstvi, Liberec, Czechoslovakia**

**Filed Aug. 8, 1975, Ser. No. 603,097**

**Claims priority, application Czechoslovakia, Sept. 4, 1974, 6073-74**

**Int. Cl.² D03D *47/36***

**U.S. Cl. 139—127 P** **6 Claims**



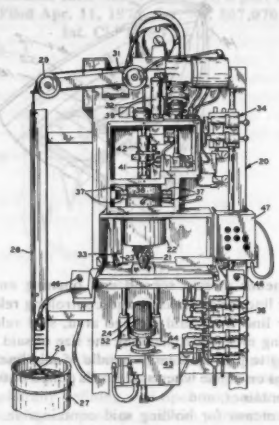
**2. Apparatus for controlling a group of piston pumps in looms with a plurality of hydraulic nozzles for weft insertion comprising individual jet nozzle means supplied by the respective individual pumps, separate delivery conduits connecting the pumps to the respective nozzles, means synchronized with the operation of the loom for simultaneously retracting the pistons of all of the pumps so as to suck liquid into the pumps, individual resilient means overcome by the piston retracting means for constantly urging the pistons in their liquid discharging stroke, valve means interposed in the conduit means connecting the pumps to the individual nozzle means whereby alternately to open and close such conduit means, and means driven in synchronism with the operation of the loom for opening and closing the respective valves.**

3,977,444

## APPARATUS AND METHOD FOR DEVELOPING WOUND COILS FOR ELECTROMAGNETIC DEVICES AND FOR INTERDEPENDENTLY CONDITIONING WINDING APPARATUS AND COIL PLACING APPARATUS

Richard E. Lauer, and Louis W. Pieper, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Continuation of Ser. No. 452,419, March 18, 1974, abandoned. This application Jan. 7, 1975, Ser. No. 539,135
Int. Cl.² B21F 3/00
U.S. Cl. 140—92.1 21 Claims



1. The method of interdependently conditioning winding apparatus useful for developing dynamoelectric machine winding coils, and coil placing apparatus for placing wound dynamoelectric machine winding coils in axially extending slots of a magnetic core, the method comprising the steps: positioning a motion transmitting member in engagement with a portion of a winding turn size determining mechanism that is operative to determine the size of winding turns developed by the winding apparatus; adjusting coil placing apparatus for a predetermined mode of operation in connection with placing wound coils in axially extending slots of a given magnetic core having a given axial length within a range of axial lengths by moving at least one part of the coil placing apparatus relative to another part of the coil placing apparatus; and adjusting the size determining mechanism, so that winding turns will be developed therewith having a size corresponding to the given axial length of the given magnetic core, by moving the motion transmitting member an amount determined by the amount of relative movement of the one part and the another part of the coil placing apparatus and thereby adjusting the portion of the winding apparatus engaged by the motion transmitting member.

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3,977,445

## ASCEPTIC FILLING APPARATUS AND METHOD

Timothy P. White, Alexandria, Va., assignor to Nobel Scientific Industries, Inc., College Park, Md.

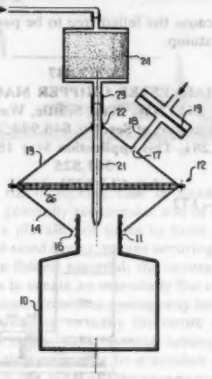
Continuation of Ser. No. 356,430, May 2, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,181
Int. Cl.² B65B 31/02
U.S. Cl. 141—5 8 Claims

1. A method of filling a container, having an open inlet at its upper end, with flowable sterile media wherein the filling employs apparatus including: an enclosure having a closed top and a lower end which includes an outlet opening of sufficient size to admit at least said upper end of said container into said enclosure in a filling position in which said outlet opening surrounds said upper end of said container with said outlet opening spaced from said container on all sides; inflow means for admitting pressurized sterile gas into said enclosure; and conduit means for said sterile flowable media extending into said enclosure from exteriorly thereof and supported by said enclosure, said conduit means being positioned to direct said sterile flowable media downwardly through said outlet opening and into the open upper end of said container; said method comprising the steps of:

pre-sterilizing said container;

surrounding the top and sides of said container inlet with the outlet opening of said enclosure;

admitting sterile gas into said enclosure through said inflow means and directing a stream of the sterile gas downwardly toward the open inlet of said container through said enclosure, said stream being sufficiently wide in cross-section when egressing through said outlet opening to surround said inlet on all sides and thereby provide a sterile flow which both enters said container through said open inlet and forms a downward flowing gas curtain which circumferentially surrounds the open inlet of said container and thereby prevents contaminants in the ambient environment from entering said container, said sterile gas being such as not to react with said sterile flowing media; and



flowing said sterile media into said container inlet through said conduit means such that said flowing sterile media is surrounded by said stream of sterile gas while entering said container.

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3,977,446

## TREE FELLING METHOD

George E. Silvey, 2252 N. 5th St., Springfield, Oreg. 97477

Filed Dec. 29, 1975, Ser. No. 644,625
Int. Cl.² A01G 23/08
U.S. Cl. 144—34 B 5 Claims

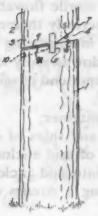
1. A method of felling a tree whereby the tree slides for a portion of its length along the tree stump to lessen the tree impact area, said method including the steps of,

cutting an undercut area in the tree defined by upper and lower surfaces, said lower undercut defining surface being cut in a downwardly inclined direction toward the tree center,

cutting backcuts along intersecting planes with each of said backcut planes inclined from the horizontal in at least two directions and intersecting along a mid-portion of the tree, and

advancing the backcuts inwardly toward the undercut defining surfaces until the tree commences falling whereat that portion of the tree end coming into contact with the lower

undercut defining surface of the tree stump will be deflected in a direction opposite to the tree falling direction



so as to cause the felled tree to be partially supported by the tree stump.

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**3,977,447**

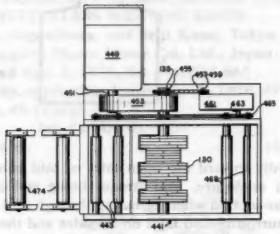
**HARVESTER CHIPPER MACHINE**

**Lionel Pease, 2333 NW. 98th, Seattle, Wash. 98107**

**Continuation-in-part of Ser. No. 848,994, Aug. 11, 1967, Pat. No. 3,884,281. This application May 18, 1973, Ser. No. 361,825**

**Int. Cl.² B27L *11/02***

**U.S. Cl. 144—172** **19 Claims**



1. A chipper head assembly for rotary milling and climb cutting a piece of wood, said assembly comprising:

a. a first chipping knife;

b. a second chipping knife;

c. said first chipping knife having a radial cutting edge and an annular cutting edge for cutting on the face of the piece of wood;

d. said second chipping knife having an annular cutting edge for cutting on the face of the wood;

e. the annular cutting edge of the first chipping knife being on a larger radius than the annular cutting edge of the second chipping knife;

f. a plurality of first chipping knives in a side-by-side relationship to form a first sub-assembly;

g. a plurality of first chipping knives in a side-by-side relationship to form a second sub-assembly; and,

h. a first means to position said first sub-assembly and said second sub-assembly in a spaced apart relationship on the same arbor.

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**3,977,448**

**METHOD AND APPARATUS FOR STORING AND RELEASING A MARINE ANCHOR LINE AND ANCHOR**

**Donald P. Botting, 7756 Thornapple Bayou Drive, Grand Rapids, Mich. 49508**

**Filed May 7, 1975, Ser. No. 575,257**

**Int. Cl.² B63B *21/22***

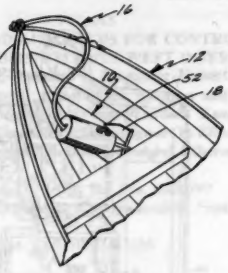
**U.S. Cl. 114—210** **28 Claims**

1. Storage, transportation, and dispensing apparatus for a marine anchor and anchor line comprising in combination:

an anchor line having an anchor end section adapted to be secured to a marine anchor and a bitter end section adapted to be secured to a vessel;

a container for receiving said anchor line;

said container including side walls defining a storage area therewithin receiving at least a portion of said line for storage therein and first and second generally opposing ends, said first end being generally closed and having an aperture therethrough, said aperture receiving therethrough said bitter end section of said anchor line to attach said apparatus to a vessel, said second end including an opening to said storage area receiving said anchor end section of said anchor line therethrough;



release means at said second end opening engaging said anchor line for restraining and controlling release of said anchor line from said storage area, said release means including means for changing the size of said second end opening to prevent a large bundle of said line from being released en masse when said line is pulled outwardly from said container; and

securing means for holding said container in a predetermined position along said anchor line to prevent said container from moving with the anchor line toward said anchor end of said line and any anchor when said line is pulled from said storage area, to prevent said bitter end from slipping into said container, and to prevent said line from being released through said aperture.

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**3,977,449**

**PROCESS FOR PRODUCING SLICED VENEER**

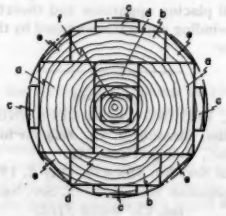
**Takeshi Sadashige, 712-5, Ugai-cho, Fuchu, Hiroshima, Japan**

**Continuation-in-part of Ser. No. 379,962, July 17, 1973, Pat. No. 3,878,016. This application Mar. 18, 1974, Ser. No. 452,267**

**Claims priority, application Japan, Sept. 17, 1973, 48-103751; Oct. 3, 1973, 48-111779; Oct. 30, 1973, 48-121190; Nov. 26, 1973, 48-131801; Nov. 28, 1973, 48-134071; Dec. 12, 1973, 48-139458; Dec. 15, 1973, 48-140660**

**Int. Cl.² B32B *31/18***

**U.S. Cl. 144—316** **19 Claims**



1. A process for producing wood veneer comprising the steps of sawing a log into a plurality of individual flitches, smoothing the surfaces of the flitches which are subsequently to be glued, applying an adhesive to the smoothed surfaces of the flitches, gluing said flitches at said adhesive-bearing surfaces to form a composite flitch, and slicing said composite flitch to the desired thickness to produce a veneer, throughout the process all of said steps being carried out while maintain-

ing the moisture content of said wood flitches at or above the fiber saturation point, said composite flitch being obtained by arranging said individual flitches into subgroups such that each subgroup has substantially the same average coefficient of shrinkage on a level when they are divided into several subgroups one dimensionally or two dimensionally, whereby there is obtained evenness of the various physical characteristics of the sliced veneer produced.

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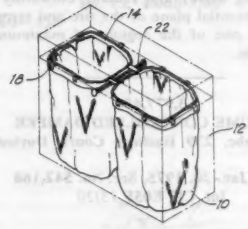
**3,977,450**
**SPRING TOP AND LAUNDRY BAG**
**Virginia Schampier, Plainview, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**
**Filed Apr. 11, 1975, Ser. No. 567,070**
**Int. Cl.² B65D *27/00***
**U.S. Cl. 150—1** **5 Claims**




1. In combination, at least one laundry bag having one open end and a plurality of clip means, said bag having a top rim portion peripherally defining said open end, said rim portion defining a plurality of openings, said rim portion further defining an internally disposed channel circumferentially transversing the same, elastic means disposed in said channel, said clip means adapted to both individually engage said opening and a horizontal support member for vertical disposition of said bag therefrom, said elastic means adapted to relax and automatically close the opening of said bag when said clip means are each individually disengaged from said openings or from said support means.

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**3,977,451**
**GOLF BAG HOOD RAIN COVER**
**Eugene B. Duba, 5000 S. Second St., Louisville, Ky. 40202**
**Filed Nov. 20, 1974, Ser. No. 525,639**
**Int. Cl.² A63B *55/00***
**U.S. Cl. 150—1.5 R** **3 Claims**

1. An arrangement comprised of a golf bag cover means in combination with golf bag hood means wherein said hood means is secured to a golf bag around the club receiving opening of said golf bag to protect golf clubs retained in said golf bag, and said hood means extends outwardly from said opening of said golf bag and has longitudinally extending hood opening means to allow access to said golf clubs, and said hood cover means includes: cap means releasably secured to the top of said hood means in spaced relation from said hood means opening; and flexible flap means of selected width extending from said cap means and completely covering said hood opening means.

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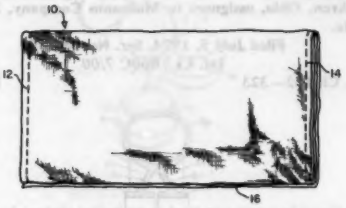
**3,977,452**
**ROLL-IN CASE**
**Marjorie E. Wright, 929 Greentree Drive, Winter Park, Fla. 32789**
**Filed Nov. 15, 1974, Ser. No. 524,083**
**Int. Cl.² B65B *43/02***
**U.S. Cl. 150—3** **21 Claims**




15. A reversible roll-in locking case of flexible material, such material being generally rectangular and of considerable length, and folded a plurality of times to form at least four approximately equal-sized layers; means securing together, at opposite ends of the folded material, the several oppositely-disposed edges so as to create an essentially flat case in which is defined a continuous, circuitous passageway having a single external opening extending virtually the entire distance between said secured edges, said opening serving to form a pocket, said case being amenable to a number of insideout movements, in which the bulk of said case is pushed inside-out through the opening, thus to cause the creation of an opening at a different part of said case, and to form a second pocket; manipulation of said successive pockets by inside-out turns making it possible for an item to be encapsulated by disposing it at a location adjacent the first external opening and thereafter moving it to an interior portion of said case by successive inside-out turns until such time as said case again has a single external opening.

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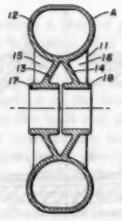
**3,977,453**
**INTEGRAL PNEUMATIC TIRE AND WHEEL MOLDED ENTIRELY FROM HOMOGENEOUS MATERIAL CONTAINING ELASTIC POLYMER**
**Aubert Yaucher Coran, and Arthur James Lambright, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.**
**Filed July 5, 1974, Ser. No. 485,807**
**Int. Cl.² B60C *7/00***
**U.S. Cl. 152—323** **14 Claims**




1. An integral tire and wheel unit, composed entirely of homogeneous extrudable elastic material, comprising a tire portion, a wheel portion and a hub, said tire portion compris-

ing a substantially enclosed chamber, said wheel portion comprising one or more support members connecting the hub and the tire portion, which wheel portion is substantially more resistant to load induced deflections than the tire portion, said tire and wheel portions being integrally molded to provide interfacial integrity therebetween each portion being homogeneous throughout.

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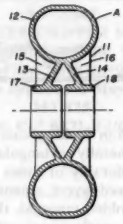
**3,977,454**

## INTEGRAL PNEUMATIC TIRE AND WHEEL COMPRISING A WHEEL PORTION WITH AXIALLY SPACED MEMBERS

**Aubert Yaucher Coran, and Arthur James Lambright, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.**

**Filed July 5, 1974, Ser. No. 485,808**
**Int. Cl.² B60C** *7/00*
**U.S. Cl. 152—323** **17 Claims**




1. An integral tire and wheel unit, composed entirely of a homogeneous moldable elastic material, comprising a tire portion, a wheel portion and a hub, said tire portion comprising a substantially enclosed chamber, said wheel portion comprising a plurality of support members connecting the hub and the tire portion, said tire and wheel portions being integrally molded to provide interefacial integrity therebetween each portion being homogeneous throughout and in which at least one of said support members is spaced axially from the midplane to impart substantial rigidity and lateral stability to the wheel portion.

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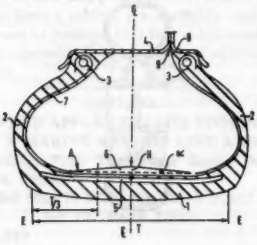
**3,977,455**

## TIRES

**Peter David Swales, Woolhampton, near Redding, and Richard John Wakelin, Huby, both of England, assignors to Dunlop Limited, London, England**

**Filed June 18, 1974, Ser. No. 480,383**
**Claims priority, application United Kingdom, June 28, 1973, 30879/73**
**Int. Cl.² B60C** *17/00, 9/18*
**U.S. Cl. 152—330 L** **7 Claims**



1. A radial ply pneumatic tire capable of being operated in a deflated condition, said tire comprising:

a substantially flat ground contacting tread portion wider than the width between flanges of the wheel rim for which the tire is designed;

a breaker assembly bracing said tread portion;

a lubricant in the tire to facilitate said deflated operation;

an internal profile in which the internal section height of the tire is at a maximum in the region between a respective one of each of the tread edges and a line parallel to the mid-circumferential plane one third of the width of the tread portion laterally inward of the respective tread edge;

means to direct the lubricant to areas of internal contact of the tire when operating in a deflated condition, said means comprising a circumferentially extending annular protrusion on the internal profile of the tread portion, each side of said protrusion having a mean slope of between 1° and 10° relative to the axis of rotation of the tire and extending axially and radially outwardly from the mid-circumferential plane of the tire and terminating in a respective one of the regions of maximum internal section height.

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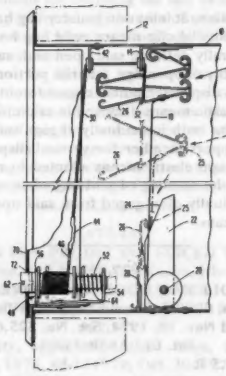
**3,977,456**

## VOLUME CONTROLLED DAMPER

**Francis J. McCabe, 239 Hastings Court, Doylestown, Pa. 18901**

**Filed Jan. 20, 1975, Ser. No. 542,168**
**Int. Cl.² E05F** *15/20*
**U.S. Cl. 160—1** **4 Claims**



1. A volume control fire damper comprising:

a. a frame;

b. a plurality of blades articulated with respect to one another and with respect to said frame so that they can be moved between the limiting conditions of fully folded wherein the damper is open to allow the maximum passage of air through the frame and fully unfolded wherein the damper is closed to prevent the passage of air through the frame;

c. retracting means connected to said blades to move said blades from an unfolded condition to a folded condition, said retracting means comprising a cable attached to said blades;

d. link means connected to said retracting means to release said blades from said retracting means and thereby permit the blades to move to an unfolded condition; and

e. adjustable volume controller means connected to said retracting means to position the blades at a plurality of fixed positions between a fully folded and fully unfolded condition, said volume controller means comprising a

frame fixed with respect to said first mentioned frame, having a shaft mounted for rotation therein, said shaft being in engagement with said cable, such that said cable retracts upon rotation of said shaft in one direction and advances upon rotation of said shaft in the opposite direction, and means engaging said shaft to fix the position of said shaft in a plurality of positions.

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3,977,457

## OPENABLE GATE END FOR WIRE TRACTION GATE

Felix B. Romberg, P.O. Box 218, Holland, Tex. 76534

Continuation-in-part of Ser. No. 270,308, July 10, 1973, Pat. No. 3,825,053. This application Apr. 10, 1974, Ser. No. 459,810

Int. Cl.² E06B *3/80*

U.S. Cl. 160—328 3 Claims

1. For use at the openable end of a wire traction gate in conjunction with a gate post and the wire barrier of the gate:

a gate end standard for supporting one end of said wire barrier and positionable adjacent said post in an upright position;

lower means for securing the lower end of said standard to said post, said lower means including a pivot extending horizontally outwardly from the post and a pivot extending vertically from the distal end of the horizontally extending pivot;

upper means for securing the upper end of said standard to said post; and

an open sided angle member mounted on the gate end standard at the lower end thereof with the open side facing the standard for engaging said vertical pivot solely on the side thereof opposite the standard and engaging said horizontal pivot at the bottom, whereby said vertical pivot can be readily hooked by said angle member from above without necessitating precise alignment therebetween and will become unhooked if the upper end of said standard is allowed to drop and whereby said standard can be pivoted about said upstanding vertical pivot under the tension of the wire barrier, said angle member being readily disengagable from the vertical pivot upon relative lateral pivotal movement of the standard with respect thereto.

3,977,458

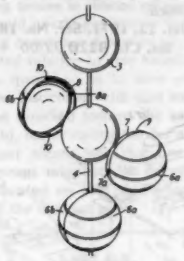
## BEAD CURTAINS

Ling Kwok Kuen, Hong Kong, assignor to Lee Loy Plastic Company, Hong Kong

Filed Apr. 24, 1975, Ser. No. 571,474

Int. Cl.² A47H *1/00*

U.S. Cl. 160—332 11 Claims



1. A bead curtain including at least one string of beads and a plurality of decorative shells each removably enclosing any selected one of the beads.

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3,977,459

## CASTING A SHAPED ALUMINUM PART ON A WORK PIECE

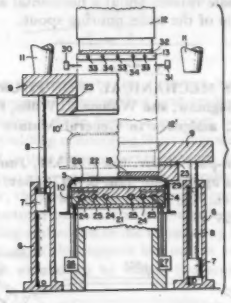
Franz Bonitz, Vienna, Austria, assignor to Gruber & Kaja, Traun, Austria

Continuation-in-part of Ser. No. 395,074, Sept. 7, 1973, abandoned. This application Dec. 4, 1974, Ser. No. 529,478

Claims priority, application Austria, Nov. 4, 1974, 8834/74

Int. Cl.² B22D *19/00*

U.S. Cl. 164—98 13 Claims



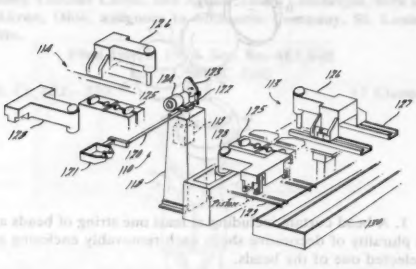
1. A process for casting a shaped part of aluminum or an aluminum alloy onto a surface of a work piece of a metal containing chromium or nickel, comprising the steps of

1. casting and shaping an aluminum or aluminum alloy melt directly on the surface of the work piece to produce an interface between the melt and the surface, and permitting the melt to contact the surface without exerting pressure on the melt in the direction of the surface,
2. maintaining a temperature in the range of about 500°C to about 700°C at the interface until an intermediate layer of an alloy of aluminum and chromium or nickel has been produced at the interface,
3. thermally insulating the surface of the work piece to maintain the temperature,
4. then permitting the melt to solidify as said shaped part under pressure.

## 3,977,460
## APPARATUS FOR CONTROLLING THE POUR RATE OF A LADLE

**Louis Badone, Willowdale; Frederick W. A. Baulch, Islington; William J. Bridges, Toronto; Robert J. Fulton, Mississauga; Jeremy N. Marr, Islington; Ralph H. Mechem, Mississauga; Joseph W. Valler, Downsview, and George G. Wellington, Oakville, all of Canada, assignors to Chrysler Corporation, Highland Park, Mich.**

**Filed Oct. 12, 1971, Ser. No. 188,056**
**Int. Cl.² B22D** *37/00*
**U.S. Cl. 164—155** **15 Claims**



**14.** An automatic ladle for pouring molten metal comprising:

a pouring ladle,

a substantially horizontal arm supporting the ladle at one end thereof for rotational movement between a substantially horizontal normal attitude for filling the ladle and a tilted attitude for pouring the metal from the ladle when the arm is rotated about its horizontal axis, and

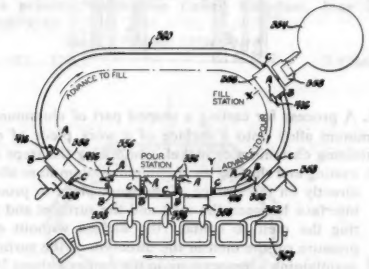
rotating means operatively connected to the arm for tilting it in a controlled manner whereby the pouring rate is controlled, and

the ladle supporting arm supports the ladle such that upon tilting the ladle rotates about a horizontal axis extending across the tip of the ladle pouring spout.

## 3,977,461
## CONTINUOUS MECHANICAL IRON POURING LINE

**Kenneth J. Pol, Saginaw, and William E. Willis, Frankenmuth, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 372,337, June 21, 1973, abandoned. This application Jan. 8, 1976, Ser. No. 647,654**
**Int. Cl.² B22D** *41/12, 47/00*
**U.S. Cl. 164—155** **10 Claims**

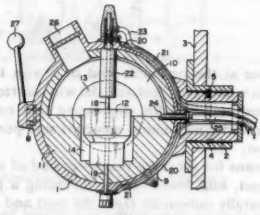



**6.** A continuous pouring line for transferring molten metal from a stationary source of molten metal to a moving conveyor line of successive molds wherein said conveyor line includes an arcuate pouring section, comprising: a horizontal support base; a support post extending on the base and defining a vertical axis coaxial with the arcuate section; a circular track on said base coaxial with said post and the arcuate section, said track having a filling section adjacent the source and a pouring section parallel to the conveyor line; a plurality of independent carriages pivotally connected at said post for rotation thereabout and supported on for movement along said circular track; a ladle supported on each of said carriages for rotation about a horizontal axis, said ladle being rotatable between a first position for receiving and carrying molten metal from the source and a second position for pouring molten metal therefrom; independently controlled drive means on each carriage engageable with the track for independently unidirectionally driving said carriages and associated ladle therearound; means for locating the carriage and ladle at said source and for disengaging the drive means thereat while said ladle is in said first position and being filled with molten metal; means for engaging said drive means after said ladle is filled with molten metal to drive said carriage and associated filled ladle to said pouring section; means for locating the carriage and the associated filled ladle at the mold in the pouring section; means for disengaging said drive means when a preceding ladle is engaged and said last mentioned means for locating is operative thereby synchronizing movement of said carriage with movement of the line so as to maintain said ladle in registry with the mold; means for rotating said ladle from said first position to said second position when said carriage movement is synchronized with the movement of the line and said carriage has engaged a preceding carriage so as to deliver molten metal to said mold when said ladle is in registry therewith; means for returning the ladle to the first position when the pouring is completed; and means engaging said drive means when a following ladle has engaged the carriage and the pouring is completed thereby returning said carriage to the source for refilling.

## 3,977,462
## APPARATUS FOR PRODUCING A DIE CAST OF A COMPLICATED SHAPE

**Isao Ohara, 27-21, Kidacho, Neyagawa, Osaka, Japan**

**Filed Dec. 16, 1974, Ser. No. 533,155**
**Claims priority, application Japan, May 20, 1974, 49-56254**
**Int. Cl.² B22D** *27/16*
**U.S. Cl. 164—256** **5 Claims**



**1.** A molding apparatus comprising in combination:

a. a base having rotation means for rotation about a horizontal axis;

b. a furnace with first and second cavities having a projection member (2) held by said rotation means for rotation having a hatch (6) for filling material into said furnace and closing the furnace air-tight;

c. a crucible defined in one of said cavities and a mold in the other of said cavities so disposed that liquid in said crucible can be flowed into said mold by partially rotating said furnace;

d. first and second electrodes extending across said chamber opposite each other and circuit means to discharge across the electrodes;

e. an inert gas injection nozzle disposed around one of said electrodes and an air outlet (24) for coupling to a vacuum

pump; and

f. means connected to said furnace to rotate the furnace.

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3,977,463

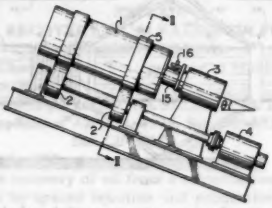
## INCLINED TYPE CENTRIFUGAL CASTING APPARATUS

Yoshihiro Sakata, Kitakyushu, Japan, assignor to Hitachi Metals, Ltd., Japan

Filed Jan. 13, 1975, Ser. No. 540,346

Int. Cl.² B22D 13/00

U.S. Cl. 164—291 27 Claims



1. A centrifugal casting arrangement comprising: a mold means, means for rotatably supporting said mold means with an axis of rotation of said mold means being inclined with respect to a horizontal plane, said supporting means including a rotatable tail stock means for supporting an end face of said mold means and a shaft means rotatably supported by said tail stock means, and means interposed between said tail stock means and said mold means for absorbing eccentricity between the axis of rotation of said mold means and an axis of rotation of said tail stock means including a disc means operatively connected with an end of said mold means, a face plate means interposed between said disc means and an end of said shaft means, projecting means provided on said face plate means, and guide means provided on said disc means and the end portion of said shaft means for receiving said projecting means and guiding the same in predetermined directions so as to absorb any eccentricity between said mold means and said tail stock means.

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3,977,464

## ROTARY STORAGE HEAT EXCHANGER STRUCTURE

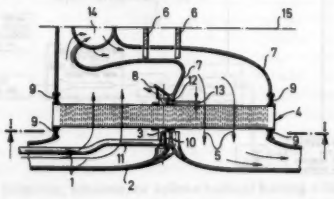
Horst Mai, Nuremberg, Germany, assignor to Maschinenfabrik Augsburg-Nuremberg AG, Nuremberg, Germany

Filed Dec. 20, 1973, Ser. No. 426,904

Claims priority, application Germany, Dec. 20, 1972, 2262226

Int. Cl.² F28D 19/00

U.S. Cl. 165—9 5 Claims



1. A seal for heat exchanger structure for multi-shaft motor vehicle gas turbines which includes in combination: housing means with inner first and second passage means for respectively conveying working air to a combustion chamber and conveying exhaust gases through said heat exchanger to a gas turbine, rotary storage heat exchanger means including rotatable disc-shaped storage body means with flow passage means extending substantially parallel to the axis of rotation of said storage body means for respectively passing hot exhaust gases and cooler compressed working air therethrough, said flow passage means communicating with said first and second passage means, said first and second passage means including housing web means separating said first and second passage means from each other, nozzle gap means provided along the extended plane of said housing web means and arranged within said housing means in spaced relationship to said storage body means, said nozzle gap means being connectable to a source of sealing compressed barrier air, said storage body means being located relative to said housing web means and said flow passage means so as to have play therebetween, guiding wall means associated with said storage body means and having a nose directed toward the same but in spaced relationship thereto, for deviating barrier air passing through said heat exchanger means into that one of said first and second passage means intended for conveying working air, said nose being located on that side which is adjacent the passage means for the exhaust gas.

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3,977,465

## SEALING ELEMENT FOR A REGENERATIVE HEAT-EXCHANGER

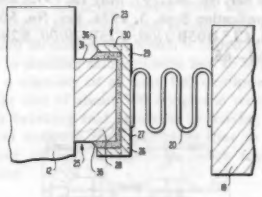
Eggert Tank, Feilbach, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 1, 1974, Ser. No. 493,840

Claims priority, application Germany, Aug. 10, 1973, 2340531

Int. Cl.² F28D 19/00

U.S. Cl. 165—9 24 Claims



1. A sealing element between a storage body means and a gas channel means of regenerative heat-exchanger, the sealing element includes a slide layer, a support bar means and a substantially yielding connecting layer disposed therebetween, characterized in that the support bar means includes a bottom portion and two side portions which laterally partly surround the slide layer, the connecting layer being applied to the inner sides of the bottom portion and of the side portions, and the slide layer being embedded in the connecting layer, and in that the side portions of the support bar means are provided with cutouts which extend up to within the area of the bottom portion.

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3,977,466

## ROOM AIR CONDITIONING APPARATUS

Sven-Olof Johansson, Marsta, Sweden, assignor to Aktiebolaget Carl Munters, Sollentuna, Sweden

Filed Mar. 22, 1974, Ser. No. 453,771

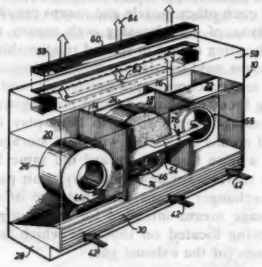
Claims priority, application Sweden, Mar. 30, 1973, 7304553

Int. Cl.² F28D 19/00

U.S. Cl. 165—40 6 Claims

1. In a room air conditioning apparatus for exchanging heat and/or moisture between fresh atmospheric air entering the room from without and consumed air being discharged from the room including an exchanger body having a first zone forming a passage for an entering air stream and a second zone forming a passage for a discharging air stream and fan means for forcing the air streams to pass through their respective

zones, the improvement permitting more effective low air velocity operation with consequent low pressure drops and reduced generation of noise comprising means positioned in each zone for determining the quantity of air passing through



each zone and causing the fan means to operate in response to such determination upon divergence of the quantity from a predetermined value to restore the quantity to the predetermined value.

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3,977,467

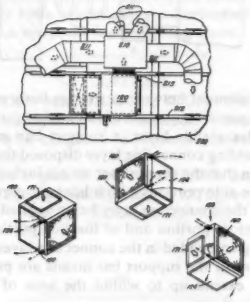
## AIR CONDITIONING MODULE

Leonard L. Northrup, Jr., 4312 Westway, Dallas, Tex. 75205

Division of Ser. No. 361,797, May 18, 1973, abandoned. This application Sept. 3, 1974, Ser. No. 502,647

Int. Cl.[2] H05B *1/00*; F25B *29/00*; F24H *3/04*

U.S. Cl. 165—65 13 Claims



8. A fan-coil unit ffor conditioning air comprising: a cabinet having a first open side defining a square air inlet opening, said cabinet having means for permitting the mounting of a square air conditioning coil unit in said opening in any one of four positions spaced at 90° intervals from each other around said opening, said cabinet having an air discharge opening positioned in a second side of said cabinet substantially perpendicular to said first side of said cabinet; a square air conditioning coil unit having a condensate drain pan and drain line along one side secured in said air inlet opening in one of said four positions with said drain pan and drain line properly operatively positioned to receive condensate; and a blower module secured within said cabinet, said blower module having an air inlet communicating with said air inlet opening in said first side of said cabinet and an air discharge passage communicating with said air discharge opening in said cabinet.

3,977,468

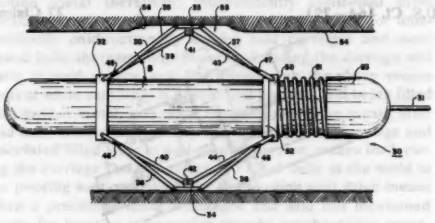
## WELL BORE CALIPER AND CENTRALIZER APPARATUS HAVING ARTICULATED LINKAGE

James Edward Brewer, and Raymond Earl Roesner, both of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 28, 1975, Ser. No. 625,993

Int. Cl.[2] E21B *17/10*

U.S. Cl. 166—241 4 Claims



1. An apparatus for traversing an earth borehole, comprising:

an elongated support member adapted for movement through an earth borehole;

a borehole-engaging member having first and second ends and a centralized pivot point;

a first arm member connected between said centralized pivot point and a fixed pivot point on said support member;

a second arm member connected between said centralized pivot point and a slidable pivot point on said support member;

a third arm member pivotally connected to the said first end of said borehole-engaging member and slidably connected to said first arm member intermediate the ends of said first arm member; and

a fourth arm member pivotally connected to the said second end of said borehole-engaging member and slidably connected to said second arm member intermediate the ends of said second arm member.

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3,977,469

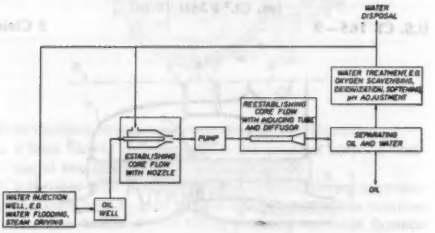
## CONSERVATION OF WATER FOR CORE FLOW

Douglas E. Broussard; Paul R. Scott, and Vitold R. Kruka, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 3, 1975, Ser. No. 546,382

Int. Cl.[2] E21B *43/22*, *43/24*; F17D *1/16*

U.S. Cl. 166—266 35 Claims


WATER DISPOSAL
WATER TREATMENT, E.G. OXYGEN SCAVENGING, DEIONIZATION, SOFTENING, pH ADJUSTMENT
REESTABLISHING CORE FLOW WITH REDUCING TUBE AND DIFFUSOR
SEPARATING OIL AND WATER
ESTABLISHING CORE FLOW WITH NOZZLE
PUMP
OIL
WATER INJECTION WELL, E.G. WATER FLOODING, STEAM DRIVING
OIL WELL

1. A process for producing oil from an oil well and transporting the oil to a terminal station comprising:

utilizing water to recover oil from an oil formation through an oil well;

producing the oil from the oil well;

establishing core flow of the oil in an annulus of water inside a conduit;

passing the core flow through a pump in the conduit to form an emulsion and subjecting the emulsion to sufficiently

high shear rate in conduit flow for a sufficiently long time to break the emulsion and create a water rich zone near the conduit wall and reform the core flow;

transporting the oil and water to a terminal station;

separating the oil and water; and

returning at least part of the water to be utilized for oil recovery and/or establishing core flow.

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3,977,470

## OIL RECOVERY BY ALKALINE-SULFONATE WATERFLOODING

Harry L. Chang, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 553,697, Feb. 27, 1975. This application Apr. 30, 1975, Ser. No. 573,235

Int. Cl.[2] E21B *43/16*

U.S. Cl. 166—273 7 Claims

1. In the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems, the method comprising:

a. injecting into said reservoir via said injection system an aqueous initiation slug containing an inorganic polyphosphate, an alkali metal carbonate, and an alkaline agent selected from the group consisting of alkali metal and ammonium hydroxides,

b. thereafter injecting into said reservoir via said injection system an aqueous surfactant slug containing a sulfonate surfactant and an alkaline agent selected from the group consisting of alkali metal and ammonium hydroxides,

c. thereafter injecting into said reservoir via said injection system an aqueous flooding medium to displace oil to said production system, and

d. recovering oil from said production system.

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3,977,471

## OIL RECOVERY METHOD USING A SURFACTANT

Walter W. Gale, Houston; Rhoderick K. Saunders, and Thomas L. Ashcraft, Jr., both of Baytown, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Sept. 26, 1975, Ser. No. 616,981

Int. Cl.[2] E21B *43/22*

U.S. Cl. 166—273 18 Claims

1. A method for recovering oil from an oil-bearing formation which comprises injecting into the formation a fluid containing an effective amount of surface-active agent having the general formula:

$$R_1O(C_nH_{2n}O)_mR_2SO_3^-X^+ \quad (a)$$

$$\begin{matrix} \\ R_3 \end{matrix}$$

or

$$R_1(C_nH_{2n}O)_mR_2SO_3^-X^+ \quad (b)$$

$$\begin{matrix} \\ R_3 \end{matrix}$$

wherein

$R_1$ is a benzene, toluene, or xylene radical having a linear or branched alkyl substituent containing from 6 to 24 carbon atoms;

$R_2$ is an alkyl, cycloalkyl, alkene or aryl radical containing up to 8 carbon atoms;

$R_3$ is a hydrogen atom, a hydroxyl radical, or an aliphatic radical containing from 1 to 8 carbon atoms;

$n$ has a value of 2 or 3;

$m$ has an average value of from 1 to 20; and

X is a cation.

3,977,472

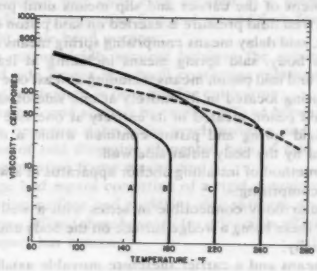
## METHOD OF FRACTURING SUBTERRANEAN FORMATIONS USING OIL-IN-WATER EMULSIONS

John W. Graham; Clay Gruesbeck, and William M. Salathiel, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Oct. 16, 1975, Ser. No. 623,198

Int. Cl.[2] E21B *43/26*

U.S. Cl. 166—283 23 Claims




1. A method of fracturing a subterranean formation surrounding a wellbore which comprises:

a. injecting into said formation, at a pressure sufficient to fracture said formation, an oil-in-water emulsion which contains from about 70 to about 90 volume percent of an internal liquid hydrocarbon phase, from about 10 to about 30 volume percent of an external aqueous phase, and a nonionic surfactant which gives said emulsion a breaking temperature that is not greater than the temperature of said formation and which is added in an amount sufficient to stabilize said emulsion and to impart to said emulsion a viscosity of at least 100 centipoises at 70°F and a shear rate of about 500 reciprocal seconds; and

b. thereafter breaking said emulsion by leaving said emulsion in said wellbore for a sufficient time to permit the temperature of said emulsion to reach said breaking temperature.

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3,977,473

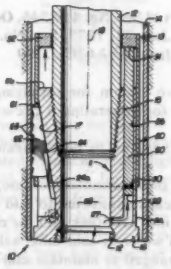
## WELL TUBING ANCHOR WITH AUTOMATIC DELAY AND METHOD OF INSTALLATION IN A WELL

John S. Page, Jr., 10424 Echo River Court, Fountain Valley, Calif. 92708

Filed July 14, 1975, Ser. No. 595,561

Int. Cl.[2] E21B *23/04*, *43/10*

U.S. Cl. 166—315 14 Claims



1. In apparatus to anchor well tubing to well casing,

a. a tubular body having an axis and an outer side wall, the body connectible in series with a well tubing string, there being a wedge surface on the body and tapering axially,

b. slip means and a carrier therefore movable axially relative to the body so that the slip means is urged relatively radially outwardly toward the casing by the wedge surface,

c. piston means carried for axial movement relative to the body, the piston means operatively connected with said carrier and having piston surface extent exposed to well fluid pressure acting to urge the piston means, carrier and slips axially as aforesaid, and

d. delay means to transmit force acting to delay said relative movement of the carrier and slip means until predetermined well fluid pressure is exerted on said piston surface extent, said delay means comprising spring means carried by the body, said spring means including at least one spring and said piston means including at least one piston, said spring located in its entirety at one side of said axis and said piston located in its entirety at one side of said axis, said spring and piston confined within a cylinder defined by the body outer side wall.

13. The method of installing anchor apparatus in a well, the apparatus comprising:

a. a tubular body connectible in series with a well tubing string, there being a wedge surface on the body and tapering axially,

b. slip means and a carrier therefore movable axially relative to the body so that the slip means is urged relatively radially outwardly toward the casing by the wedge surface,

c. piston means carried for axial movement relative to the body, the piston means operatively connected with said carrier and having piston surface extent exposed to well fluid pressure acting to urge the piston means, carrier and slips axially as aforesaid, and

d. delay means to transmit force acting to delay said relative movement of the carrier and slip means until predetermined well fluid pressure is exerted on said piston surface extent, the delay means comprising spring means, said method comprising

e. adjusting said spring means to provide predetermined force acting on said piston means to delay said axial movement thereof,

f. running said achor apparatus into a well in series with said well tubing and exposing the piston means to well fluid pressure.

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**3,977,474**

## EMERGENCY RESERVE WATER AND FOAM GENERATING SYSTEM

**Paul Boegli, 595 E. Valley View Drive, New Holland, Pa. 17557**

**Continuation-in-part of Ser. No. 410,246, Oct. 26, 1973. This application Jan. 27, 1975, Ser. No. 544,509**

**Int. Cl.[2] A62C** *35/00*

**U.S. Cl. 169—9** **8 Claims**

1. A water reserve system for supplying fresh water for emergency use and for generating a fire-extinguishing foam comprising:

a supply conduit adapted to be connected to a source of fresh water;

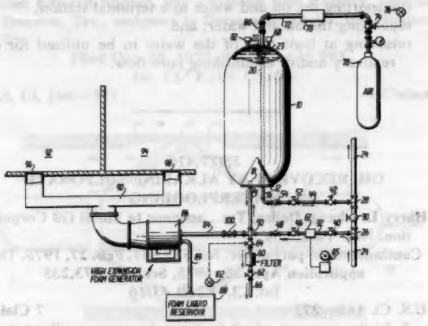
a standby tank of predetermined volume;

inlet and outlet means connected to said tank for introducing fresh water into said tank and for continually replenishing the fresh water in said tank, said inlet and outlet means being arranged to maintain said tank in a substantially full condition during normal non-emergency use;

means connected to said tank and said supply conduit for diverting fresh water from said supply conduit into said tank and back to said supply conduit;

means operatively connected to said tank for generating a volume of air-water foam; and

means connected to said foam generating means for distributing said air-water foam to a remote location for extinguishing a fire at said location.

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**3,977,475**

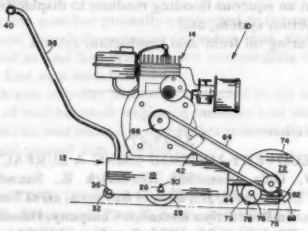
## LAWN EDGER

**Charles Zugai, 2011 Bandera Road No. 1009, San Antonio, Tex. 78228**

**Filed Sept. 29, 1975, Ser. No. 617,953**

**Int. Cl.[2] A01D** *35/00*

**U.S. Cl. 172—15** **10 Claims**



1. An edger comprising:

a base frame having an upper surface, sides and a front, handle means connecting to said base frame for moving said edges;

central axle means for supporting a plurality of wheel means connected to said sides of said base frame, a plurality of first wheel means for supporting said base frame above the ground rotatable on said central axle means;

second wheel means for supporting said base frame connected to the rear of said sides;

a cutter head;

extension means from said base frame for supporting said cutter head in front of said edger;

shaft means of said cutter head rotatably connected to said extension means, said shaft means carrying means for cutting on one end thereof;

motor means for powering said cutting means mounted on said base frame, said motor means turning said shaft means;

guide means adjacent said cutting means for following a surface to be trimmed, said guide means having a third wheel means connected thereto for rotation on said surface;

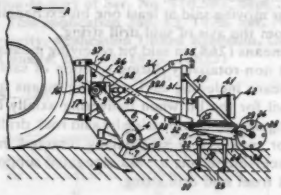
said edger being balanced above said first wheel means so that said edger may be tilted backwards on said second wheel means and forward on said third wheel means and remain in either respective position if no force is acting thereon.

3,977,476

## SOIL CULTIVATING IMPLEMENTS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Aug. 8, 1974, Ser. No. 495,776
Claims priority, application Netherlands, Aug. 15, 1973, 7311227
Int. Cl. ²A01B *33/02*, *33/06*, *21/06*, *63/14*
U.S. Cl. 172—51 7 Claims



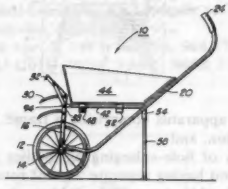
1. An agricultural implement movable over the ground comprising a combination of a rotary cultivator and a rotary harrow, said rotary cultivator being arranged in front of said rotary harrow and having a frame supporting a plurality of soil working elements rotatably mounted on a substantially horizontal transverse axis, said harrow comprising a frame portion supporting a plurality of soil working members arranged in a transverse row and rotatably mounted on corresponding upwardly extending axes, a first upwardly extending coupling member being connected to the front of said frame, a second upwardly extending coupling member being connected to said frame portion said coupling members being interconnected by pivoted arms, said cultivator and said harrow being vertically movable with respect to one another during travel, a driving system being in driving engagement with said elements via a transmission of said cultivator and with the soil working members via a further transmission of said harrow.

3,977,477

## COMBINATION GARDEN IMPLEMENT APPARATUS

James Glenn Wise, 3725 NW. 34, Oklahoma City, Okla. 73112

Continuation-in-part of Ser. No. 386,006, Aug. 6, 1973, abandoned. This application Dec. 12, 1974, Ser. No. 531,973
Int. Cl.² A01B *49/04*, *1/20*; B62B *1/20*
U.S. Cl. 172—246 2 Claims



1. A combination garden implement usable through dual orientation for cultivation, subsoil clearance and cartage capabilities comprising:

a support wheel;

a pair of fork frame means each rotationally supported from said support wheel on opposite sides thereof and extending transversely co-planar, right angle bend portions outward from said support wheel;

manipulative frame means which is generally elongated and affixed to said fork frame means proximate said support wheel, the elongated manipulative frame means being secured to said fork frame means and formed at a bend to extend at an angle of approximately 45° from the plane of said fork frame means, said manipulative frame means further consisting of a pair of diverging elongated bars affixed on opposite sides relative to said wheel means and including plural transverse frame bars rigidly secured therebetween in spaced relationship;

plural transverse bars affixed in generally parallel, spaced disposition between said fork frame means right angle bend portions;

at least one cultivating means secured to each of said transverse bars to extend into ground contacting attitude when said implement is oriented for cultivation;

a pair of side braces each having first and second ends with respective first ends each secured at a predetermined angle to a respective first and second fork frame means right angle bend portion;

blade means rigidly secured between the second ends of said side braces in subsoil contacting relationship when said implement is oriented for cultivation;

first and second support bar means affixed between respective opposite right angle bend portions and respective ones of said diverging elongated bars of said elongated manipulative frame means; and

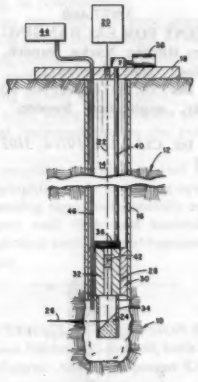
cartage bed means consisting of a rigid container having a bottom surface and enclosing side surfaces and securing means affixed therebeneath for releasable affixure to said support bar means.

3,977,478

## METHOD FOR LASER DRILLING SUBTERRANEAN EARTH FORMATIONS

Lowell Z. Shuck, Morgantown, W. Va., assignor to The Unites States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 20, 1975, Ser. No. 624,029
Int. Cl.² E21C *19/00*
U.S. Cl. 175—16 5 Claims

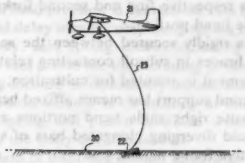


1. An improvement in the method for providing an elongated bore in a subterranean earth formation by the steps of directing a collimated monochromatic light beam into a bore hole in registry with the earth formation and reflecting the light beam into the earth formation to effect penetration thereof by causing a phase change in the earth formation to form the elongated bore; said improvement comprising the step of pressurizing the bore hole adjacent to said earth formation with a gas transparent to said light beam, with said gas being at a pressure sufficiently greater than the pore pressure in the earth formation to force fluids generated by the absorption of said light beam into pores and fissures in the earth formation contiguous to said elongated bore.

## 3,977,479
## GEOLOGICAL EXPLORATION METHOD AND APPARATUS

Cleo Sainsbury, Indian Hills, Colo., assignor to Airsamplex Corporation, Indian Hills, Colo.

Filed Jan. 15, 1971, Ser. No. 106,810
Int. Cl.² E21B 49/00
U.S. Cl. 175—58 12 Claims

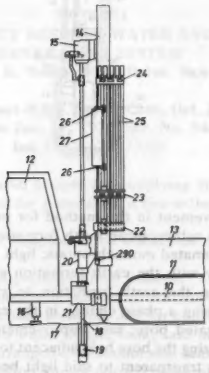


1. A method of accumulating useful geological data on a selected region of the earth's surface comprising the steps of:
- operating a fixed-wing conventional aircraft at low absolute altitude over the selected region,
- collecting a sample of solid surface material from a selected point on the surface of the region from the aircraft while maintaining the aircraft airborne and while operating the aircraft along a path substantially parallel to the surface of the earth,
- geographically identifying the location from which the sample was collected,
- determining the geological nature of the sample,
- correlating the characteristics of the sample with the location from which it was taken; and
- repeating the steps of collecting, geographically identifying, determining, and correlating at other selected points in the region.

## 3,977,480
## ARRANGEMENT FOR EXCHANGING DRILL BITS

Jonas Olof Anders Hilding, Nacka, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Dec. 16, 1974, Ser. No. 533,136
Claims priority, application Sweden, Dec. 21, 1973, 7317339
Int. Cl.² E21B 19/14, 3/02
U.S. Cl. 175—85 13 Claims



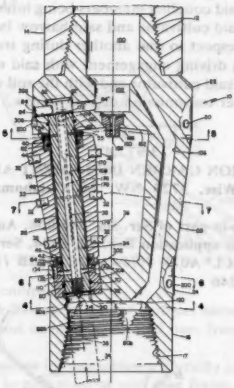
1. In a drill rig in combination: an elongated support (14), a rock drilling machine (15) mounted on said support for reciprocal movement therealong, a plurality of drill rods for making up a drill string (18), said drill string being connectable at one end thereof to said rock drilling machine to be rotated and driven longitudinally with respect to said support, a drill bit (19) mounted on the other end of said drill string, at least one drill bit exchanging device (21) at the forward end of said support for exchanging said drill bit,

the improvement comprising:
- means (260) in said at least one bit exchanging device for receiving said drill bit,
- means for moving said at least one bit exchanging device to and from the axis of said drill string,
- holding means (268) in said bit receiving means for holding the bit non-rotatively during rotation of said drill string, and means including said receiving means for providing an anvil for the bit when delivering axially directed impacts against said drill string by said rock drilling machine and for transferring said axially directed impacts from said receiving means to said elongated support to loosen the bit from said drill string.

## 3,977,481
## BORING APPARATUS

Allan T. Fisk, Salem, and Carl R. Peterson, Boxford, both of Mass., assignors to Rapidex, Inc., Gloucester, Mass.

Continuation-in-part of Ser. No. 448,245, March 5, 1974, Pat. No. 3,897,837. This application June 9, 1975, Ser. No. 585,452
Int. Cl.² E21B 9/24
U.S. Cl. 175—228 17 Claims



1. Boring apparatus comprising a frame having a primary axis of rotation, and
- a plurality of hole-enlarging assemblies mounted on said frame and having separate axes of rotation radially outward of said primary axis, said separate axes generally converging downwardly toward said primary axis,
- each said assembly having a working member rotatably mounted upon an elongated shaft passing through the working member and adapted for acting upon the wall of the hole being bored,
- said frame having a connection means at its bottom for supporting a further element of the drill string, said connection means defining a hollow space,
- a passage associated with each of said hole-enlarging assemblies extending through said frame downwardly from said assembly, along the respective axis to said hollow space, said hollow space and each passage being correspondingly sized and clear of obstruction to enable insertion of the respective elongated shaft through said hollow space into said passage, thence through said working member to an upper support point to hold said working member in

operating position, and retaining means for retaining said shaft in said position.

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**3,977,482**

## WIRE LINE CORE BARREL ASSEMBLY

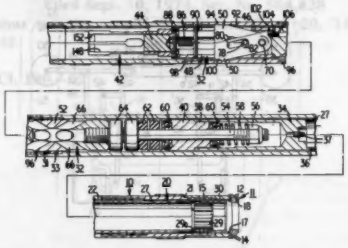
**Edward W. Reed, North Bay, and Edgar J. Sharpe, Thornhill, both of Canada, assignors to Federal Drilling Supplies Limited, Canada**

**Continuation-in-part of Ser. No. 510,567, Sept. 30, 1974, abandoned. This application Jan. 13, 1975, Ser. No. 540,705**

**Claims priority, application United Kingdom, Oct. 4, 1973, 46319/73; Canada, Dec. 17, 1974, 216231**

**Int. Cl.² E21B** *9/20*

**U.S. Cl. 175—246** **8 Claims**



1. Core recovery apparatus comprising a core barrel for receiving and retaining a drill core and a head assembly therefor, the head assembly having an expansible lifting collet connected thereto and a retrieval apparatus adapted to engage with and transmit lifting forces to the head assembly and core barrel, including an overshot assembly, the overshot assembly including a head member adapted to enter into the expansible lifting collet, the collet and the head member having surface portions designed to permit lifting forces to be transmitted therebetween in the non-expanded condition of the collet, and a locking collar mounted for movement on the overshot assembly between a locking position where said collar closely embraces the lifting collet to prevent expansion thereof and a retracted non-locking position wherein expansion of the lifting collet and withdrawal of the head member are permitted.

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**3,977,483**

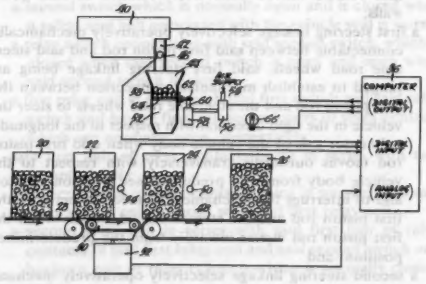
## MATERIAL HANDLING APPARATUS AND METHOD

**James G. Greanias, Louisville, Ky., assignor to The Kingsford Company, Louisville, Ky.**

**Filed Apr. 2, 1975, Ser. No. 564,271**

**Int. Cl.² G01G** *19/04, 13/02;* **B65B** *57/00*

**U.S. Cl. 177—1** **15 Claims**




9. An apparatus for filling packages to a predetermined weight in a production line comprising a means for underfilling a package with a product, means for determining the weight of said package, means for determining the additional product required to fill the said package to its predetermined weight, a feeder for dispensing additional product, an electric eye which signals a computer when product passes therethrough for tabulating the additional product emitted from said feeder, and a hopper to accumulate said additional product and dispense it to said package.

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**3,977,484**

## ELECTRONIC SCALE APPARATUS WITH DEAD WEIGHT CALCULATING MEANS

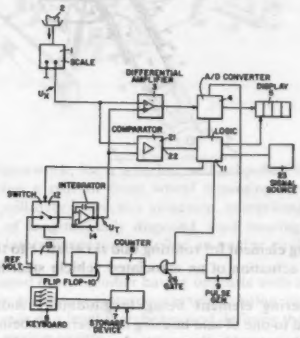
**Manfred Kammerer, Albstadt 1-Ebingen, Germany, assignor to August Sauter GmbH, Albstadt 1-Ebingen, Germany**

**Filed May 23, 1975, Ser. No. 580,209**

**Claims priority, application Germany, May 24, 1974, 2425107**

**Int. Cl.² G01G** *23/14*

**U.S. Cl. 177—165** **4 Claims**




1. An electronic scale apparatus, for use in determining the net weight of an object including a tare placed on a weighing scale, comprising, in combination:

selecting means operable for generating a digital signal corresponding to the dead weight of said tare;

digital to analog conversion means coupled to said selecting means and operable for producing a first analog signal corresponding to said digital signal;

said weighing scale being operable for producing a second analog signal corresponding to the gross weight of said object;

a differential amplifier coupled to said conversion means and to said weighing scale and being operable for producing a third analog signal substantially equal to the difference between said first and second analog signals, whereby said third analog signal represents the net weight of said object.

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**3,977,485**

## SNOW VEHICLE SUSPENSION SYSTEM

**Burke A. West, and Michael R. Bethell, both of Monroe, Mich., assignors to Monroe Auto Equipment Company, Monroe, Mich.**

**Filed Oct. 25, 1974, Ser. No. 517,866**

**Int. Cl.² B62M** *27/00*

**U.S. Cl. 180—5 R** **30 Claims**

1. A suspension strut for a snow vehicle having at least one steerable ski,

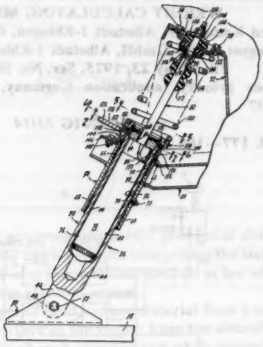
said strut comprising first and second telescopically slidable housings, one of said housings being fixedly secured to an associated portion of the vehicle,

means on one of said housings for securing said strut directly to the steerable ski,

shock absorbing means within one of said housings and including a damping piston cooperable with a quantity of damping fluid, and a piston rod extending axially from one end of said strut, said shock absorbing means being

operable to dampen relative telescopic movement between said first and second housings,

a helical coil spring means arranged coaxially of said strut, said spring means comprising the main suspension spring for said ski and yieldably resisting movement of said ski toward the vehicle, and



a steering element for rotating said ski relative to the vehicle upon actuation of an associated vehicle steering mechanism,

said steering element being longitudinally slidably connected to one of said housing members and being simultaneously rotatable therewith about an axis extending generally coaxially of said strut when a steering force is applied to said element by said associated vehicle steering mechanism.

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**3,977,486**

## MOUNTING FOR EXHAUST INSTALLATIONS OF MOTOR VEHICLES

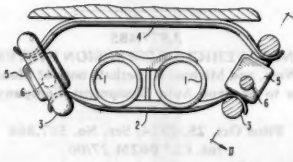
**Einhard Kleinschmit, Esslingen-Hegensberg, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany**

**Filed Mar. 26, 1975, Ser. No. 562,097**

**Claims priority, application Germany, Mar. 30, 1974, 2415536**

**Int. Cl.² B60K 13/04**

**U.S. Cl. 180—64 A** **8 Claims**



**1.** A mounting support for exhaust gas installations of motor vehicles in which at least one exhaust pipe is secured in a holding means, said holding means is suspendingly retained in ring means consisting of elastic material, and said ring means are suspended from mounting means fixed to the vehicle, wherein the ring means are provided with abutment bumper means and, web means formed in one piece with the ring means and the abutment bumper means for retaining said abutment bumper means inside the ring shape of said ring means with the surfaces of said abutment bumper means being spaced from a surface defining the ring shape whereby said abutment bumper means limits the spring deflection of the ring means.

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**3,977,487**

## VEHICLE STEERING SYSTEM

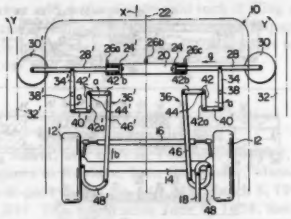
**Shinji Katayose, Yokohama; Hiromichi Uchiyama, Tokyo; Shigeru Tanisawa, and Mitsuharu Hamada, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Apr. 21, 1975, Ser. No. 569,615**

**Claims priority, application Japan, Apr. 27, 1974, 49-48146**

**Int. Cl.² B62D 1/24**

**U.S. Cl. 180—79** **4 Claims**



**1.** A steering system of a vehicle capable of traveling on usual roads and on roads with parallelly extending two guide walls at both sides thereof, the vehicle having steerable road wheels movably carrying the vehicle body, the steering system comprising:

a hydraulic cylinder secured to the front portion of the vehicle transversely with respect to the longitudinal center axis of the vehicle body, said cylinder being provided therein with first and second pistons having first and second piston rods, respectively, which are axially aligned and extend in the opposite direction to each other;

first and second guide rollers respectively rotatably mounted on the first and second piston rods of said hydraulic cylinder at the respective ends of said rods opposite said pistons, said guide rollers being contactable with the inner surfaces of said two guide walls;

said pistons defining, with said hydraulic cylinder, a chamber therebetween, the admission of hydraulic fluid to said chamber being effective to move the respective piston rods to a predetermined position wherein said guide rollers are in contact with the inner surfaces of said two guide walls and establishing a fluid communication between said pistons which permits said piston rods to move transversely relative to said predetermined position when said vehicle moves transversely relative to said guide walls;

a first steering linkage selectively operatively mechanically connectable between said first piston rod and said steerable road wheels, said first steering linkage being arranged to establish mechanical connection between the first piston rod and the steerable road wheels to steer the vehicle in the right direction with respect to the longitudinal center axis of the vehicle body when said first piston rod moves outwardly transversely with respect to the vehicle body from said predetermined position thereof, and to interrupt the mechanical connection between the first piston rod and the steerable road wheels when the first piston rod moves inwardly from the predetermined position; and

a second steering linkage selectively operatively mechanically connectable between said second piston rod and said steerable wheels, said second steering linkage being arranged to establish connection between the second piston rod and the steerable road wheel to steer the vehicle in the left direction with respect to the longitudinal axis of the vehicle body when said second piston rod

moves outwardly transversely with respect to the vehicle body from said predetermined position thereof, and to interrupt the mechanical connection between the second piston rod and the steerable road wheels when the first piston rod moves inwardly from the predetermined position.

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3,977,488

## SHIFT LOCKING DEVICE FOR VEHICLE MANUAL TRANSMISSION

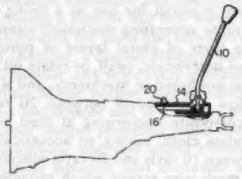
Tadayosi Kameyama, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sept. 10, 1974, Ser. No. 504,828

Claims priority, application Japan, Sept. 20, 1973, 48-109345

Int. Cl.² B60R 21/10

U.S. Cl. 180—82 1 Claim




1. In a motor vehicle with a manual transmission having a striking rod operated by a manual shift lever to move upon shifting into gears, the combination with the striking rod of notch means formed in said striking rod; a locking plunger engageable in said notch means to lock said striking rod against movement thereof and a electrical switching arrangement so constructed and arranged that it causes said locking plunger to disengage from said notch means when predetermined safety measures have been taken by a driver of the motor vehicle, in which said switching arrangement comprises:

a first switch which is normally open and is closed when a vehicle seat is occupied;

a second switch which is normally open and is closed when a safety seat belt associated with the vehicle seat is worn;

a relay switch cooperating with said second switch, which is closed when said second switch is open and open when said second switch is closed;

a first relay coil in series with said first switch and said relay switch and having first and second pairs of relay contacts which are normally open, respectively;

said first pair of relay contacts being in series with said second switch;

said second pair of relay contacts being in parallel with said relay switch and in series with said first relay coil;

a second relay coil in series with said first pair of relay contacts of said first relay coil and said second switch and having a pair or relay contacts which is normally closed; and

means including a solenoid in series with said pair of relay contacts of said second relay coil for biasing said locking plunger to disengage from said notch means when said solenoid is deenergized and for biasing said locking plunger to engage said notch means when said solenoid is energized.

3,977,489

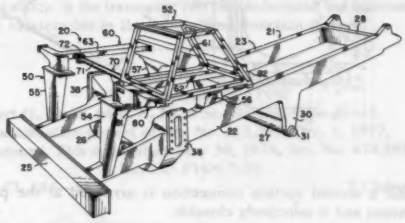
## FRAMEWORK FOR A WHEELED SELF-PROPELLED TRUCK

Carroll R. Cole; Richard E. Guhl, and Lloyd E. Terry, all of Decatur, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 24, 1975, Ser. No. 543,760

Int. Cl.² B60P 1/16; B62D 21/02

U.S. Cl. 180—89 R 10 Claims




1. A framework, for a wheeled, self-propelled truck of the type having a pair of front wheel mounting struts and an operator roll-over protective structure, comprising:

a pair of longitudinally disposed, load bearing main side rails laterally spaced to define an engine cavity therebetween;

a U-shaped cross member having opposite ends and extending in transverse, interconnecting relation between said side rails at a level therebelow and defining the bottom of said engine cavity;

means for individually mounting said pair of wheel mounting struts in cantilevered, laterally disposed relation to said main side rail at the opposite ends of said cross member;

a superstructure interconnecting said main side rails at a raised elevated position thereabove and including a generally U-shaped, horizontally disposed cross support structure defining the top of said engine cavity, and disposed in bordering relation thereabout so that said cavity is opened vertically to permit unobstructed access thereto from above; and

a mounting structure carried by said superstructure in laterally offsetting relation to said engine cavity for supporting the operator cab roll-over protective structure.

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3,977,490

## HEAT PROTECTION FOR A VEHICLE ACCUMULATOR

Manfred Flaig, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Apr. 3, 1975, Ser. No. 564,919

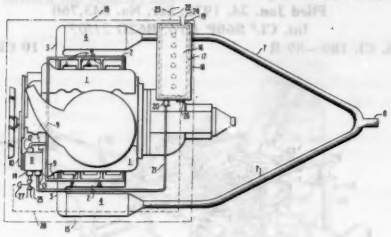
Claims priority, application Germany, Apr. 6, 1974, 2416807

Int. Cl.² B60R 18/02

U.S. Cl. 180—68.5 13 Claims

1. A motor vehicle driven by an internal combustion engine which includes an electric accumulator means arranged in the engine space and an air pump means having a suction connection means for blowing-in air during after-treatment of the engine exhaust gases, wherein the accumulator means is substantially encapsulated by a protective housing means, two line connection means are provided at the protective housing means which are disposed relatively far from one another in the flow direction, one line connection means is operatively connected with the suction connection of the air pump means while the other line connection means is operatively connected with a place in the motor vehicle which is protected and is disposed during operation at least approximately at the outside temperature, the protective housing means encapsu-

lates the accumulator means on all sides and leaves an intermediate air space with respect to the accumulator housing,



and a second suction connection is arranged at the pump means and is selectively closable.

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3,977,491

## GAS-CUSHION VEHICLES

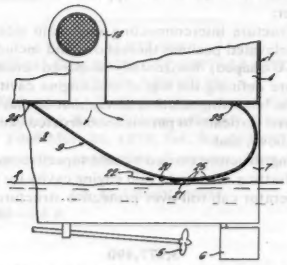
Ronald Christopher Fishlock, Toronto, Canada, assignor to Hovermarine Transport Limited, Southampton, England

Continuation of Ser. No. 407,839, Oct. 19, 1973, abandoned. This application Oct. 6, 1975, Ser. No. 620,117

Claims priority, application United Kingdom, Oct. 23, 1972, 48771/72

Int. Cl.² B60V *1/04*

U.S. Cl. 180—120 8 Claims



1. A vehicle for travelling over a surface and which, in operation, is supported above such surface by a cushion of pressurized gas contained beneath the vehicle, comprising a body having front and rear ends and a pair of laterally spaced side walls extending longitudinally of the body in substantial parallelism so as to dip into the surface and provide a cushion seal, a flexible skirt of hollow inflatable form depending from the vehicle body and extending laterally between the side walls adjacent the rear end of the body so that the bottom of the skirt defines a convex face in close proximity to the surface over which the vehicle is travelling to form a plenum gap between the surface and convex face through which an atmosphere-seeking flow of cushion gas escapes at the rear end of the body, the flexible skirt being impermeable except for said convex face, and said convex face being provided with a multiplicity of bleed holes so that skirt inflation fluid can bleed through said convex face to suppress any tendency for local pressure changes to take place in said flow as a result of the Bernoulli effect.

3,977,492

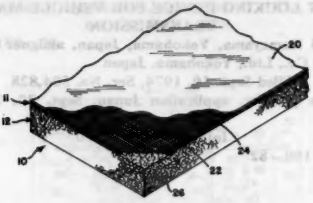
## ACOUSTICAL MATERIAL FOR USE IN ASSOCIATION WITH NOISE GENERATING MACHINERY

Keith M. Hankel, Dayton, Ohio, assignor to Acon, Inc., Dayton, Ohio

Filed Jan. 9, 1975, Ser. No. 539,854

Int. Cl.² E04B *1/99*; G10K *11/04*

U.S. Cl. 181—33 G 4 Claims



1. An acoustical material for use as a lining material in association with noise generating machinery consisting of:

a. a composite layer of plural layers of porous material which will not deteriorate, swell, or retain oil, solvents or water such as are found in machinery, and which has an acoustical flow resistance of between 20 rayls and 80 rayls, said composite comprising at least one layer of woven fiberglass cloth, having an acoustical flow resistance of between 10 rayls and 20 rayls adhesively bonded to an open mesh wire screen which provides structural integrity for said composite layer, and

b. a highly porous layer which is or acts as a dead air space relative to said composite, said highly porous layer being a non-woven fibrous mat having a binder therein.

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3,977,493

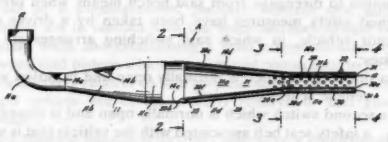
## EXHAUST CONTROL METHOD AND APPARATUS

Kay Keith Richardson, 614 Park St., Baytown, Tex. 77520

Division of Ser. No. 221,179, Jan. 27, 1972, Pat. No. 3,786,791. This application Nov. 1, 1973, Ser. No. 412,937

Int. Cl.² F01N *1/00*

U.S. Cl. 181—42 24 Claims



1. An exhaust control apparatus for an internal combustion engine, including:

a casing having a chamber formed therein communicating with the exhaust port of an internal combustion engine through an inlet opening for receiving therein the mixture of high and low frequency pressure waves of the exhaust gases of the engine which are vented to the atmosphere through an outlet opening formed through said casing;

means positioned in said chamber for substantially separating the flow of high frequency pressure waves from the remainder of the exhaust gas pressure wave flow;

means positioned in said chabmer for sttenuating the sound of the high frequency pressure wave flow wherein the flow of exhaust gas is controlled; and

said separating means includes a conduit having a flow passage therethrough positioned in said chamber for flowing through said flow passage the remainder of the exhaust gas pressure wave flow and having a surface for

turning the flow therethrough to produce a standing wave.

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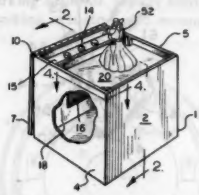
3,977,494

## ADJUSTABLE SUPPORT AND HOUSING FOR A DOLL AND THE LIKE

Wylie J. Ulin, 1633 N. Kedvale Ave., Chicago, Ill. 60639

Filed May 30, 1975, Ser. No. 582,284
Int. Cl.² H05K 5/00
U.S. Cl. 181—148 10 Claims



1. A combination enclosure and display device comprising a container having a bottom and side walls, a wall within the container subdividing the same into an audio system enclosure and a sound chamber, a display platform slidably mounted in said sound chamber and selectively positionable in a lower stowed position at the bottom and in various positions between the top and bottom and in a display position at the top of said chamber, means providing audio communication between said enclosure and said sound chamber, and friction means interposed between said container and platform for holding said platform at selected elevated positions, said platform extending parallel with said bottom and subdividing said chamber horizontally into upper and lower sections in the intermediate positions thereof, and a sound source in said audio system enclosure.

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3,977,495

## RESCUE APPARATUS

Gerard Zephinie, Paris, France, assignor to Societe Soberal S.A., Luxemburg

Division of Ser. No. 477,071, June 6, 1974. This application Apr. 16, 1975, Ser. No. 568,445
Claims priority, application France, June 5, 1974, 73.25410
Int. Cl.² A62B 1/20
U.S. Cl. 182—48 3 Claims

1. An apparatus for slowing down the rate of descent of falling bodies being evacuated from a series of superposed elevated points along a building wall to a point therebelow, comprising a plurality of like flexible tubular devices coaxially aligned with each other and extending vertically along the building wall, each flexible tubular device having an upper open end and a lower open end, the upper end of each tubular device being substantially at the level of one of the elevated points and the lower end of a superposed one of the tubular devices extending into the upper end of the next lower one of the tubular devices for a sufficient distance to be held therein against outward displacement, an access opening in each tubular member adjacent its open end, the tubular devices being elastic in the transverse and circumferential but substantially inextensible in the longitudinal direction thereof.

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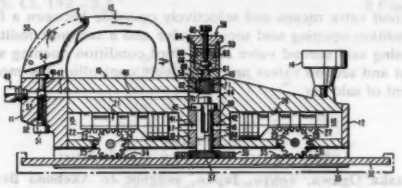
3,977,496

## AIR TOOL LUBRICATOR

Robert G. Black, 6601 N. Main St., Dayton, Ohio 45415

Continuation-in-part of Ser. No. 311,337, Dec. 1, 1972, abandoned. This application May 30, 1974, Ser. No. 474,595
Int. Cl.² F16N 7/30
U.S. Cl. 184—55 A 3 Claims



1. A lubricating device for a fluid pressure operated pneumatic tool comprising a tool mounted upstanding hollow body having a lower open end bore for communicating with the interior of the tool, the upper end of the bore providing a transverse valve seat and relatively reduced aperture means therein communicating with the upper portion of the hollow body, a wick installed as a plug in the lower open end of the bore with its top spaced below said valve seat, a valving means of less diameter than the inside diameter of said lower end bore and of greater diameter than the reduced aperture means loosely positioned between the top of the wick and said valve seat, and closure means on the top of the hollow body whereby liquid lubricant can be admitted so as to be stored in the hollow body and flow through the reduced aperture means around the valving means and soak the wick when the tool is not pressurized and upon operable pressurization of the tool the pressurized fluid therein passing up through the wick will seat the valving means against the valve seat closing the reduced aperture means and preventing liquid lubricant passing downwardly through said reduced aperture means and again wetting said wick until the operable pressurization of the tool has been discontinued and the valving means sinks by gravity away from said reduced apertured means.

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3,977,497

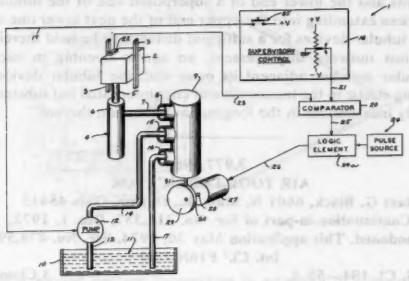
## HYDRAULIC ELEVATOR DRIVE SYSTEM

David Claude McMurray, Whitefish Bay, Wis., assignor to Armor Elevator Company, Inc., Louisville, Ky.

Filed Feb. 26, 1975, Ser. No. 553,442
Int. Cl.² B66B 1/04
U.S. Cl. 187—29 A 32 Claims

1. A hydraulic elevator drive system wherein a fluid pump is operatively connected through fluid control means to a hydraulic actuator operatively controlling the movement of an elevator car, wherein said fluid control means comprises a control structure providing chamber means having a first port operatively connected to said hydraulic actuator and a second port operatively venting fluid from said chamber means and a third port operatively connected to said fluid pump, first valve

means operable between open and closed positions and controlling the fluid flow through said first port, second valve means operable between open and closed positions and controlling the fluid flow through said second port, and common valve operator means operatively connected to said first and




second valve means and selectively operable between a first condition opening said second valve and a second condition closing said second valve and a third condition opening said first and second valves and selectively controlling the movement of said car.

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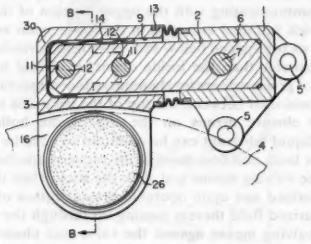
**3,977,498**

## DISC BRAKE CALIPER MOUNTING

**Yutaka Ogawa, Tokyo, Japan, assignor to Akebono Brake Industry Co., Ltd., Japan**

**Continuation of Ser. No. 360,646, May 16, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,594**
**Claims priority, application Japan, May 17, 1972, 47-48960**
**Int. Cl.² F16D** *55/224*
**U.S. Cl. 188—73.3** **6 Claims**



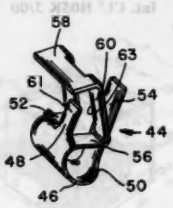

1. A disc brake, for a vehicle, of the single-cylinder caliper type, comprising, in combination, a sliding caliper assembly having an acting member on one side of a disc and a reacting member on the opposite side thereof, so that said caliper assembly straddles the periphery of the disc; each of said members having a respective friction pad associated therewith, each of said friction pads being engageable with the disc; said caliper assembly having a head interconnecting said acting and reacting members and straddling the disc; said head being formed with an elongated, substantially horizontal slot extending parallel to and outwardly of a tangent to the disc with its bottom side being bridged by a bridge portion of said head, and said slot having spaced sidewalls, and a top wall defined by said head; said slot being open at at least one end to receive an elongated member fixed to the vehicle structure and extending substantially horizontally in said slot, with lateral clearance, to suspend said caliper assembly; and means interengaged between said member and said caliper assembly and guiding said caliper assembly for movement axially of said disc.

**3,977,499**

## DISC BRAKE SHOE ANTI-RATTLE CLIP

**Donald D. Johannesen, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.**

**Continuation of Ser. No. 483,996, June 28, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,644**
**Int. Cl.² F16D** *65/00*
**U.S. Cl. 188—73.5** **2 Claims**




1. In a disc brake having a rotor including a pair of opposed friction faces, a torque member disposed adjacent said rotor and having a pair of opposed inner edges, a friction element slidably mounted on said torque member, said friction element having torque transmitting portions adjacent each of said inner edges, one of said torque transmitting portions cooperating with its corresponding inner edge to define a gap therebetween during a brake application while the rotor is rotating in one direction and closing said gap to transmit torque to the torque member through said one torque transmitting portion and the corresponding inner edge during a brake application while the rotor is rotating in the opposite direction, means for urging said friction element into braking engagement with its corresponding friction face; and antirattle means including a resilient sheet metal body portion defining a loop located out of said gap, said loop having an axis and a pair of edges, said axis and said edges extending substantially parallel to the corresponding inner edge of the torque member, a pair of substantially flat, homogeneous sheet metal legs extending from corresponding ones of said edges into said gap whereby the resiliency of said body portion spreads said legs so that one of said legs engages said one inner edge and the other of said legs engages the corresponding torque transmitting portion to restrain rattling movement of the friction element when the brake is released, said other leg terminating in a section extending substantially parallel to said torque transmitting portion and perpendicular to the rest of said other leg and cooperating with said loop to define a recess receiving said torque transmitting portion of the friction element, said other leg defining an opening receiving said one leg when said torque transmitting portion moves toward said corresponding inner edge whereby braking torque is transmitted through both of said legs during braking when the rotor is rotating in the opposite direction.

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**3,977,500**

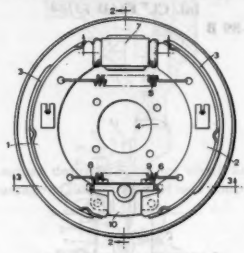
## SHOE DRUM BRAKES FOR VEHICLES

**Glyn Phillip Reginald Farr, Kenilworth, England, assignor to Girling Limited, Birmingham, England**

**Continuation of Ser. No. 355,439, April 30, 1973. This application Sept. 15, 1975, Ser. No. 613,328**
**Claims priority, application United Kingdom, May 4, 1972, 20820/72**
**Int. Cl.² F16D** *65/24, 51/24*
**U.S. Cl. 188—106 A** **7 Claims**

1. An internal shoe-drum brake comprising arcuate shoes carrying friction linings for engagement with a rotatable drum, said shoes having first and second opposite pairs of ends, said ends of said second pair each having first and second load bearing faces, a service actuator for separating said first pair of ends for braking, a parking actuator operable entirely independently of said service actuator for separating said second

pair of ends incorporating expander means acting directly on said first bearing faces of said second pair of ends, abutments independent of said expander means engageable by said second bearing faces of said second pair of ends to take the braking loads when the brake is applied by said service actuator, said abutments being so constructed, arranged and positioned with respect to said parking actuator that service braking forces on said shoes are taken directly by said abutments independently of said expander means when said brake is applied by said service actuator, means for transmitting braking forces from one shoe to the other when the brake is applied by said parking actuator, energy storing means incorporated in said parking actuator, and means for releasing the



energy stored in said energy storing means in order to apply to said shoes through said parking actuator a force to urge said shoes into engagement with said drum irrespective of the initial position of said shoes when said means for releasing is operated; said service actuator comprising opposed pistons working in an open-ended bore in a cylinder and having outer ends adapted to engage directly with said first pair of shoe ends, said pistons being adapted to separate when hydraulic fluid under pressure is introduced therebetween for normal service braking, and mechanical abutment means carried by said pistons at their inner ends adapted to engage to define a mechanical strut through which force from one shoe can be transmitted to the other when said parking actuator is operated.

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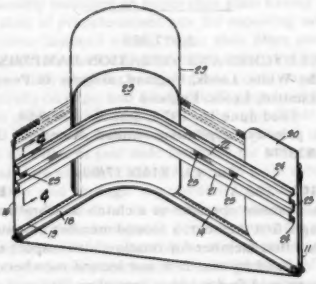
**3,977,501**

## LUGGAGE CASE CONSTRUCTION

**Juan Perez Alonso, Naucalpan de Juarez, Mexico, assignor to Samsonite Corporation, Denver, Colo.**

**Filed June 24, 1974, Ser. No. 482,274**
**Claims priority, application Mexico, Mar. 25, 1974, 150089**
**Int. Cl.² A45C *3/00*, *13/00***
**U.S. Cl. 190—49** **7 Claims**



1. A luggage case construction, comprising:

an open-sided shell of relatively soft flexible material and generally rectangular geometry having back, top, bottom and end walls;

a cover removably located over the shell open side; and

an elongated flexible stiffener of predetermined configuration having a width dimension at least several times that of its overall thickness arranged to extend along the inner surface of the shell end, top and a portion of the bottom walls and in continuous contact therewith, said stiffener having such flexibility and memory characteristics that it can withstand deforming forces applied to the top wall sufficient to bring the top wall into contact with the bottom wall, and on removal of the deforming forces the stiffener will reassume its predetermined configuration.

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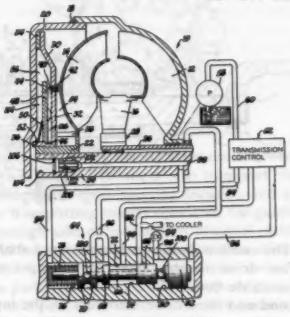
**3,977,502**

## HYDRODYNAMIC DRIVE AND SLIPPING CLUTCH

**Howard E. Chana, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 21, 1975, Ser. No. 579,617**
**Int. Cl.² F16D *47/06***
**U.S. Cl. 192—3.3** **3 Claims**




1. An automotive transmission comprising:

an input drive member;

an output driven member;

a torque converter including an impeller secured to said input drive member, and a turbine drivingly connected to said output driven member;

a fluid operated friction clutch drivingly connected for unitary rotation with said turbine and frictionally engaging said input drive member including an engagement chamber disposed between the clutch and the turbine, a disengagement chamber disposed between the clutch and the input driven member, and a variable area opening fluid flow restriction disposed on said clutch communicating between said engagement chamber and said disengagement chamber to control fluid flow and the resultant differential pressure between said chambers so that the clutch is controlled by an axial force to slippingly engage the input drive member;

a control plate connected to said variable restriction and being disposed on said friction clutch in said disengagement chamber for unitary rotation with said clutch and said turbine and being axially movable to control the area opening of said variable restriction;

a first control chamber formed between said control plate and said input drive member being filled with fluid so that a pressure gradient proportional to the average speed of the input member and the output member is generated;

a plurality of pressure balance openings formed in said control plate communicating with said first control chamber;

a spring member disposed in said first control chamber abutting said control plate and urging same toward said clutch; and

a second control chamber formed between said control plate and said clutch and being in communication with said pressure balance openings and being filled with fluid so that a pressure gradient is generated therein sufficient to provide equal pressure in both said control chambers at said pressure balance openings, whereby when the speed of said input drive member is at or above a predetermined value greater than the speed of said output driven member said control plate will be moved axially to reduce the area of said variable restriction thereby increasing the engagement force of said clutch to maintain a predetermined speed differential between the impeller and turbine of said torque converter.

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**3,977,503**

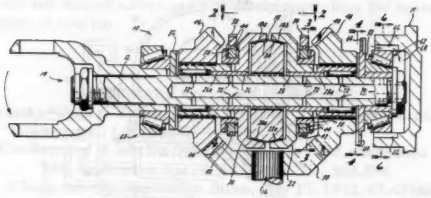
**CLUTCH**

**John W. Hurst, Port Huron, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed July 23, 1975, Ser. No. 598,313**

**Int. Cl.² F16D *43/21, 13/28***

**U.S. Cl. 192—21** **20 Claims**



1. The combination of rotatable input shaft means,

a first drive member fixed to the input shaft means and rotatable therewith,

second and third drive members on the input shaft means, axially movable and independently rotatable thereon and positioned one to each side of the first drive member,

adjacent portions of the first drive member and the second and third drive members being provided with cooperating means for forming a driving-driven relationship when either of the second or third drive members is axially moved into contact with the first drive member thereby causing rotation of the second or third drive member by the first drive member upon its rotation,

means for selectively placing the second and third driven members into individual contact with the first drive member and for placing both of the second and third drive members out of contact with the first drive member,

two gears in a substantially axially fixed position on the input shaft means and independently rotatable thereon, each gear being positioned adjacent a side of either of the second and third members which side is opposite the side for contacting the first drive member, the two gears and the second and third drive members forming two drive member-adjacent gear pairs, and

a plurality of complementary, radially distributed, overlapping, helical camming surfaces on adjacent portions of the second and third drive members and the gears, the surfaces extending between each drive member-gear pair to couple them together for rotation, the complementary helical surfaces of one drive member-gear pair being opposite handed relative to those of the other drive member-gear pair, the camming surfaces of each pair being in mutual overlapping relationship over the complete range of axial movement of the respective second or third drive members whereby contact and rotation of either the second or third drive member with the first drive member causes rotation of the respective adjacently coupled gear through driving engagement between the corresponding complementary camming surfaces and the driving engagement of the camming surfaces urges the second or third drive member axially toward the drive member for more positive contact therewith while continuing to rotate the adjacent gear.

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**3,977,504**

**SHOT-PEENED DIAPHRAGM CLUTCH SPRING**

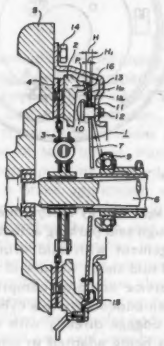
**Kouji Kajitani, Hirakata, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Japan**

**Filed Sept. 19, 1975, Ser. No. 615,106**

**Claims priority, application Japan, Oct. 2, 1974, 49-114172**

**Int. Cl.² F16D *13/44***

**U.S. Cl. 192—89 B** **1 Claim**



1. A diaphragm spring for diaphragm spring-type clutch, which comprises

a peripheral annulus (16) functioning as a spring;

a plurality of reed pieces (7), (7) inwardly extending from said peripheral annulus (16) to function as a release lever;

stud pin holes (8), (8) at the roots of reed pieces (7), (7);

a radially inwardly extending rim of said peripheral annulus (16) supported between wire rings (10) and (11) arranged between a clutch cover (13) and a head of a stud pin (12) fixed to said clutch cover (13), an outer periphery thereof being contacted against a pressure plate (2); at least a portion of the concave rear surface (1b) only of the peripheral annulus (16) of said diaphragm spring being provided with a shot-peened layer.

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**3,977,505**

**CLUTCHES AND VIBRATION DAMPERS**

**David John White, Leeds, England, assignor to Powder Couplings Limited, Leeds, England**

**Filed June 16, 1975, Ser. No. 586,854**

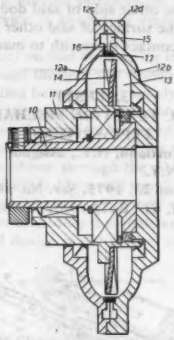
**Claims priority, application United Kingdom, June 18, 1974, 26823/74**

**Int. Cl.² F16D *37/00***

**U.S. Cl. 192—105 A** **11 Claims**

1. A mechanism operable as a clutch or vibration damper comprising a first member, a second member mounted coaxially on said first member for rotation with respect thereto, a chamber defined by said first and second members, a radial extension on said first member extending into said chamber, particulate coupling medium in said chamber for forming a vibration damping or drive coupling between said first and

second members, and a passage extending radially outwardly of said chamber wherein a screen is provided across said



passage, said screen defining openings which are dimensioned to allow the passage of dust but not of said coupling medium.

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**3,977,506**

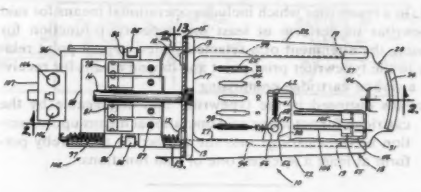
## COIN SLIDE ASSEMBLY

**William McNally, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa**

**Filed Nov. 19, 1975, Ser. No. 633,448**

**Int. Cl.² G07F 3/02**

**U.S. Cl. 194—55** **12 Claims**



1. A coin slide apparatus for initiating the operation of a machine with a predetermined combination of coins supported on edge and convertible from one actuating combination of coins to another, the combination comprising: slide support means for mounting said coin slide apparatus to said machine and including a generally vertical faceplate having at least one opening for passing coins on edge and further including a slide housing defining a coin slide guideway extending through said faceplate; a coin slide assembly supported on said slide housing and reciprocally movable in said guideway, said slide assembly including an upper slide plate having a plurality of coin slots of predetermined size for receiving said coins, a body portion fastened to said upper slide plate and having a plurality of coin receiving pockets aligned below said slots in said upper slide plate for receiving said coins standing generally vertically on edge, and a lower latch plate having openings generally aligned with said slots in said upper slide plate and with said pockets in said body portion, said latch plate being retained as a part of said slide assembly for movement therewith, said slide assembly being reciprocal from a coin receiving position and through intermediate coin measuring and coin ejecting positions to an operative position for activiating said machine; slide movement control means for preventing movement of said slide assembly to said operative position in the absence of said predetermined combination of authentic coins and including a plurality of latch arms engageable with said latch plate in the absence of coins of a predetermined diameter; and coin ejection means including at least one open port in said slide housing at said coin ejecting position through which coins are ejected.

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**3,977,507**

## COIN TESTING ARRANGEMENT FOR PARKING METERS

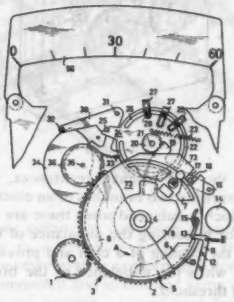
**Bernhard Kaiser, Villingen-Schwenningen, Germany, assignor to Kienzle Apparate GmbH, Villingen, Germany**

**Filed Sept. 19, 1975, Ser. No. 614,785**

**Claims priority, application Germany, Sept. 21, 1974, 2445204**

**Int. Cl.² G07F 3/02**

**U.S. Cl. 194—99** **4 Claims**




1. In a parking meter, a coin testing arrangement, comprising, in combination, means defining a coin transport channel extending intermediate a coin-insertion location and a coin receptacle; coin transporting means operative for guiding an inserted coin through said coin transport channel, said coin transport channel being widened at a portion thereof to have a breadth which exceeds the thickness of the coins to be processed by the parking meter by an amount permitting coins passing through said portion to shift in direction transverse to the direction of travel of the coins; magnet means operative for attracting into contact with a wall of said coin transport channel coins which are magnetically attractable as such coins pass through said portion; and sensing means operative for controlling the setting of a parking time in dependence upon whether coins passing through said portion are attracted into contact with said wall, including a sensing member extending into said coin transport channel and so positioned and mounted as to be displaced to a predetermined position by a coin which during travel through said portion is being magnetically held against said wall and means for preventing setting of a parking time unless said sensing member is caused to assume said predetermined position.

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**3,977,508**

## DEVICE FOR RECOGNIZING A CATEGORY OF COINS

**Philippe Baumberger, Bourg la Reine, France, assignor to Compagnie Generale d'Automatisme, Paris, France**

**Filed June 2, 1975, Ser. No. 583,098**

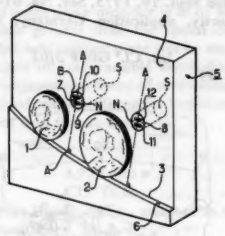
**Claims priority, application France, June 19, 1974, 74.21262**

**Int. Cl.² G07F 3/02**

**U.S. Cl. 194—100 A** **3 Claims**

1. A device for recognizing a category of coins of ferromagnetic substance and having a given diameter, comprising, in combination, means for guiding the coins along a line of a first plane, defined by the circumference of the coins, said coins remaining parallel to said plane, two magneto-resistances having a front face arranged in a second plane parallel to said first plane, said magneto-resistances being substantially close to each other, said magneto-resistances being centered in said second plane on a line in said second plane, and perpendicular

to said first-mentioned line at one point, the two magneto-resistances being located on a same side in relation to said first-mentioned line and arranged along the second-mentioned perpendicular line so that at the time of passing of a coin belonging to the category to be recognized, it covers only one of the magneto-resistances, means for producing a constant magnetic field whose lines of force are perpendicular to the



front faces of the said magneto-resistances, said magneto-resistances comprising two branches of an electrical measurement bridge which is balanced when there are no coins, electronic means for measuring the unbalance of the said bridge at the time of the passing of a coin and providing an output control signal, when the unbalance of the bridge reaches a predetermined threshold.

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**3,977,509**

**BAR-CODE WRITER**

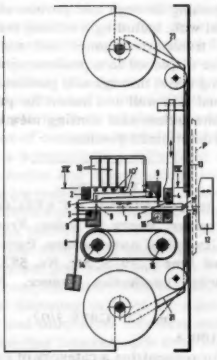
**Carolus Pieter Leersnijder, Heemstede, Netherlands, assignor to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands**

**Filed Oct. 17, 1974, Ser. No. 515,589**

**Claims priority, application Netherlands, Oct. 18, 1973, 7314356**

**Int. Cl.² B41J** *3/04, 9/36*

**U.S. Cl. 197—1 R** **22 Claims**



**1.** A mechanism for marking a bar code on a document comprising:

A. an apertured surface,

B. means for pressing one side of said document against said apertured surface to hold it stationary with respect to said apertured surface,

C. stylus means for marking the other side of said document through the aperture, and

D. means to move said stylus means towards and into contact with the other side of said document and subsequently along the surface of said other side of said document while in contact therewith to mark a bar thereon.

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**3,977,510**

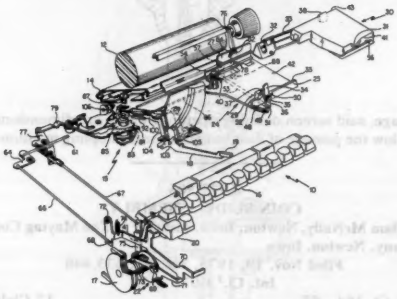
**AUTOMATIC FUNCTION MECHANISM FOR TYPEWRITERS**

**Edwin J. Hurley, Cortland, N.Y., assignor to SCM Corporation, New York, N.Y.**

**Filed June 23, 1975, Ser. No. 589,726**

**Int. Cl.² B41J** *19/62, 33/02*

**U.S. Cl. 197—91** **37 Claims**



**1.** In a typewriter which includes operational means for said typewriter to perform at least one typewriter function for causing the alignment of a selected platen impact point relative to the typewriter print point and having means for receiving a ribbon cartridge comprising:

means disposed in the typewriter and engageable by the cartridge for actuating said operational means upon insertion of the cartridge into the typewriter to thereby perform at least a selected one of said functions.

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**3,977,511**

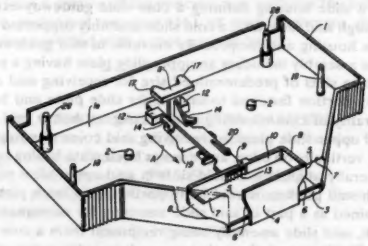
**RIBBON LOADING DEVICE**

**Hans Hengelhaupt, Nurnberg, Germany, assignor to Triumph Werke Nurnberg A.G., Nurnberg, Germany**

**Filed Apr. 2, 1975, Ser. No. 564,495**

**Int. Cl.² B41J** *31/10*

**U.S. Cl. 197—151** **17 Claims**



**1.** A throwaway device for aiding the installation of inked ribbon spools in a typing machine and the simultaneous threading of an inking ribbon extending between spools in the ribbon fork of said typing machine comprising,

a housing having spool locating means for receiving and locating a ribbon supply and take-up spool,

guides in the housing for cooperating with locating means on the typing machine for locating and mounting the said spools in their correct positions on the typing machine when the device is placed in ribbon loading position thereon,

and guide surfaces on said housing for inclining to the plane of ribbon passage through said ribbon fork portions of the ribbon extending between said supply and take-up spools to permit insertion thereof into guide hooks on said ribbon fork when the device is placed in position in said typing machine without the need for the installer to manually feed the ribbon through the ribbon fork, and

means for releasably holding said supply and take-up spools in said housing whereby after said spools are mounted and the ribbon extending therebetween is simultaneously threaded, said device may be lifted away.

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**3,977,512**

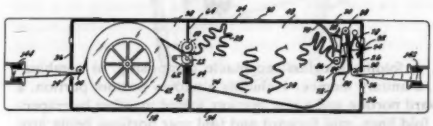
**RIBBON CASSETTE AND RIBBON ADVANCE**

**LeRoy O. Teagarden, San Leandro; Carmeli Adahan, Berkeley, and William A. Ashmore, San Ramon, all of Calif., assignors to The Singer Company, New York, N.Y.**

**Filed June 30, 1975, Ser. No. 591,367**

**Int. Cl.² B41J** *33/10, 33/30, 35/28*

**U.S. Cl. 197—168** **5 Claims**



1. An ink ribbon cassette for a printer having a print head which travels in a first direction and in a second direction opposite to said first direction over a record media for printing alphanumeric characters thereon comprising:

a housing having an entrance and an exit;

an inking ribbon in the form of a mobius loop having at least a portion of its length located within said housing and entering therein by way of said entrance and leaving therefrom by way of said exit;

a first chamber in said housing containing a portion of said ribbon and into which said entrance opens;

inking means in said first chamber contacting at least a portion of the ribbon located in said first chamber to transfer ink thereto;

a second chamber in said housing for the storage of inked ribbon therein and including said exit;

ribbon driving means located between said first chamber and said second chamber for transporting said ribbon from said first chamber and stuffing the same in random convolutions in the second chamber;

one way clutch coupled to said ribbon driving means and having a latch arm extending therefrom into the path of travel of said print head; and

means on said print head for alternately engaging said latch arm of said one way clutch during at least a portion of the travel of said printhead to move said latch arm in said first direction and then in said second direction opposite to said first direction to actuate said ribbon driving means during movement of said latch arm in one of said directions to thereby increment said ribbon in and out of said cassette as said printer traverses said record media.

**3,977,513**

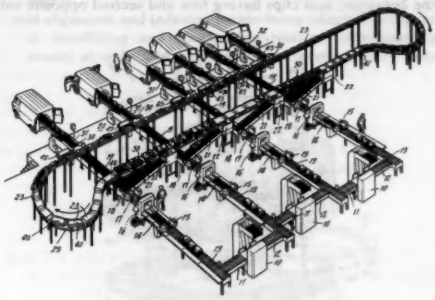
**CART CONVEYOR SYSTEM**

**George T. Rushforth, Costa Mesa, Calif., assignor to Sun Chemical Corporation, New York, N.Y.**

**Filed May 28, 1974, Ser. No. 473,346**

**Int. Cl.² B65G** *43/00, 47/38*

**U.S. Cl. 198—38** **8 Claims**



1. A conveyor system for conveying a stack from a stack loading means to a remotely positioned stack discharge means; said conveyor system comprising a train of stack receiving carts connected end to end and being angularly movable relative to one another, a closed track for receiving said train of carts and for guiding their motion around a closed path which passes said stack loading means at a first point in said closed path and which passes said stack discharge means at a second point in said closed path; and drive means for driving said train of carts around said closed path; each of said carts of said train of carts having a bottom surface for receiving at least one stack from said stack producing means and a lateral gate extending along one edge of said bottom surface and movable between an upright position for holding a stack in said cart and in an opened position for permitting the discharge of a stack from said cart; said gate open position comprising a lowered position in which said gate is substantially coplanar with said bottom surface; each of said carts having latch means for latching their said gate in their said upright positions, and latch defeating means for defeating said latch means and opening said gates of said carts; a gate closing means for closing and latching at least selected gates of said carts after said carts have passed said first point of said closed path and after loading of stacks in said carts, and gate latch defeating means operable for operating said latch defeating means of said gate latches of at least selected carts, thereby to open said gates of said selected carts at said second point in said closed path, and adjacent said stack discharge means and to enable the discharge of stacks from said selected carts at said second point; said track being normally horizontal and normally maintaining said carts with their said bottom surface horizontal to the ground at at least said second point; said track being tilted from the horizontal at said first point, whereby said track tilts said carts and their said bottom surface from the horizontal to cause said stacks to slide against said gates before said carts reach said first point in said path, whereby stacks are discharged from said carts by gravity when said gates are opened.

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**3,977,514**

**BUTTERFLY CONVEYOR CLIP FOR FLAT BED FILTER**

**Frank R. Kaess, Oneida, N.Y., assignor to Clarkson Industries, Inc., New York, N.Y.**

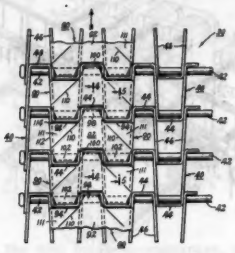
**Division of Ser. No. 384,424, Aug. 1, 1973, Pat. No. 3,876,547. This application Nov. 19, 1974, Ser. No. 525,208**

**Int. Cl.² B65G** *15/48;* **B01D** *33/04*

**U.S. Cl. 198—193** **14 Claims**

1. A clip adapted to be attached to a perforate conveyor having spaced transverse bars therein, said clip cooperating with other similar clips on the conveyor to provide a substan-

tially continuous surface on said conveyor, said clip comprising a relatively flat plate for covering perforations in said conveyor between said transverse bars, said plate having an upper surface substantially coplanar with the top of said conveyor and depending curved resilient tab members comprising downwardly extending curved extensions of the clip for resiliently engaging confronting surfaces of adjacent transverse bars of said conveyor thereby to removably secure the clip to the conveyor; said clips having first and second opposite side



edges of predetermined generally complementary configuration including flat projections extending therefrom having free end portions which extend over the adjacent transverse conveyor bars to which the clip is secured, thereby to form said substantially continuous surface with adjacent clips; said tab means extending downwardly from the free end portions of said projections to positions below and direclty beneath the projections for resilient engagement with their associated transverse conveyor bars.

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**3,977,515**

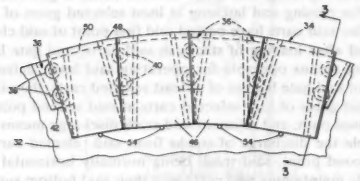
## HARD-SURFACED SCREW CONVEYOR FOR CENTRIFUGES

**Elwin J. Lewoczko, Lakeville, Mass., assignor to Bird Machine Company, Inc., South Walpole, Mass.**

**Filed Dec. 16, 1974, Ser. No. 533,198**

**Int. Cl.² B65G *33/00***

**U.S. Cl. 198—213** **8 Claims**



**1. A hard surfaced screw conveyor for centrifuges comprising:**

**a helical metal blade mounted for rotation about the longitudinal axis of the helix and having radially disposed side surfaces extending to an end surface;**

**a plurality of wear resistant segments mounted on a surface of the blade, said segment and said blade surface provided with mating parts wedged together to mount said segments on said blade and to permit movement thereof only in the radially inward direction toward the blade axis;**

**keeper means retaining said segments against such radially inward movement; and**

**said segments including a first set which are wider at their radially outer than their radially inner ends, and a second set intervening segments of said first set having a different shape with side edges parallel to the opposed side edges of the segments of said first set at opposite sides thereof, so that, upon removal of said keeper means, segments of said second set can be removed by sliding radially inwardly of said blade surface, and segments of said first set can be similarly removed after removal of a segment of said second set at one side thereof.**

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**3,977,516**

## EYEGLASS RECEPTACLE

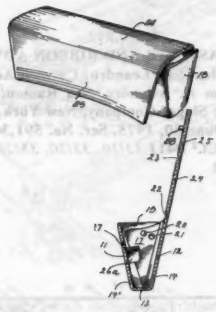
**Enrique Jesús Ramón Tilve, Jose Marti 1467, Buenos Aires, Argentina**

**Filed July 1, 1974, Ser. No. 484,999**

**Claims priority, application Argentina, June 29, 1973, 248857**

**Int. Cl.² A45C *11/04***

**U.S. Cl. 206—5** **6 Claims**



**1. A folding eyeglass receptacle comprising, in combination, a unitary member including a narrow bottom portion, a forward portion and a rear portion, joined together by respective fold lines, said forward and said rear portions being provided with respective lateral, generally triangular wing portions having nipples and corresponding openings selectively provided therein and securing them together, the edge of said rear portion remote from said bottom portion extending along another fold line, and a lid portion attached to said rear portion, which lid portion terminates in a foldable lapel portion superposed in the closed condition of the receptacle over said forward portion, the latter and said lid portion being provided with further nipples and corresponding openings therein for connecting them together, and wherein said bottom portion is substantially shorter than the combined lengths of said forward and said rear portions with the respective ones of said wing portions thereon, the receptacle in the folded and closed condition displaying a side view of an inverted truncated cone, the apparent edges of which are formed successively by said bottom, said forward, said lid and finally said rear portions.**

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**3,977,517**

## CONTACT LENS CARRYING CASE

**John Kadlecik, Macedon; Wayne R. Manning, Victor, and John R. Williams, III, Rochester, all of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.**

**Continuation of Ser. No. 490,535, July 22, 1974, abandoned. This application June 30, 1975, Ser. No. 590,222**

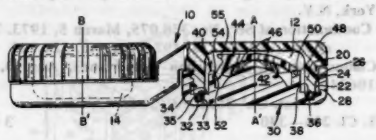
**Int. Cl.² A45C *11/04*; B08B *11/02***

**U.S. Cl. 206—5.1** **14 Claims**

**1. A case for carrying contact lenses comprising:**

**a. a body including first and second sides and at least one liquid storage means said sides facing in opposite directions, said liquid storage means having first and second openings, said openings being disposed about separate and spaced apart construction axes, said first opening being disposed on said first side, said second opening being disposed on said second side;**

b. first and second cap means, said first cap means cooperating with said first opening and said second cap means cooperating with said second opening to close said liquid storage means; and



c. means for holding a pair of contact lenses, said means being supported on one of said liquid storage means and said cap means.

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**3,977,518**

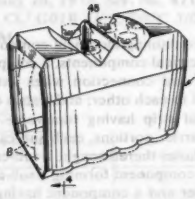
**BOTTLE PACKAGE**

**Edwin L. Arneson, Hillsdale, N.J., assignor to Federal Paper Board Company, Inc., Montvale, N.J.**

**Continuation-in-part of Ser. No. 582,656, June 2, 1975, abandoned. This application Oct. 14, 1975, Ser. No. 621,656**

**Int. Cl.² B65D** *65/06, 75/04, 5/02*

**U.S. Cl. 206—141** **8 Claims**



1. In a wraparound type package for a group of bottles or the like arranged in double row relation and in transversely aligned pairs, a tubular container formed from a blank of foldable sheet material which is wrapped about the top, opposite sides and bottom of said group of bottles, said container comprising a top wall forming panel disposed on the top of the bottles, adjoining side wall forming panels extending along the outermost sides of the bottles in the two rows, and co-operating bottom wall forming panels folded beneath the bottles, which bottom wall forming panels have overlapped marginal portions with interengaging locking elements connecting said panels, means for restraining the bottles at the bottom thereof against movement out of the ends of the tubular container, means at the opposite ends of the top wall forming panel for restraining the endmost bottles against movement out of the ends of the container, and a handle forming structure extending in a vertical transverse plane which comprises panels cut in part from the top wall forming panel and disposed in downwardly folded relation from a transverse hinge line in the plane of the top wall forming panel, said handle panels being positioned between center pairs of bottles, and said handle panels having opposite end portions which are connected to the adjoining side wall forming panels by triangular web members and which are provided with finger accommodating apertures.

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**3,977,519**

**SLIDE STORAGE TRAY**

**Claes L. Hultgren, 334 Harris Ave., Clarendon Hills, Ill. 60514**

**Filed May 9, 1974, Ser. No. 468,598**

**Int. Cl.² G03B** *23/06*

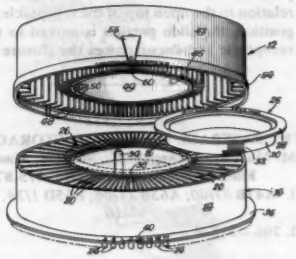
**U.S. Cl. 206—216** **21 Claims**

1. A slide storage tray adapted for use with a complementary slide projection tray of the type having a plurality of slide compartments with openings at one side of the slide projection tray for the insertion and removal of slides, said slide storage tray comprising:

a tray body having cooperating walls and partition means defining a plurality of slide storage compartments with openings at one side of said tray body for the insertion and removal of slides; and

alignment and indexing means at only said one side of said tray body adjacent said slide storage compartment openings;

said alignment and indexing means being adapted to engage in interfitting and cooperating relation with coacting means at only said one side of a complementary slide



projection tray adjacent the slide compartment openings of the latter when the trays are fitted together in mating relation with the openings of their respective compartments juxtaposed in only a single relative position of the trays;

whereby alignment and orientation of said slide storage compartments of said slide storage tray with the slide compartments of the slide projection tray is effected in only a single relative position of the trays such that predetermined slide compartments of the slide projection tray are in slide transfer relation with only corresponding predetermined slide storage compartments of said slide storage tray.

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**3,977,520**

**PACKAGE HAVING A SLIDE ACTUATED CLOSURE MEMBER**

**Wolfgang H. Grimm, Louisville, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.**

**Filed Oct. 7, 1974, Ser. No. 512,957**

**Int. Cl.² B65D** *5/38, 85/12*

**U.S. Cl. 206—270** **7 Claims**

1. A package for cigarettes or other articles comprising:

a. a receptacle for housing cigarettes or other articles having front, rear and side wall panels and a bottom panel and defining an open top for removal of said articles,

b. a slide actuated integral lid structure comprised of:

1. a slide portion disposed about the receptacle and reciprocally slidable vertically of the receptacle,
2. a closure member, receivable within the slide portion, for closing the open top of the receptacle,
3. cooperative means on the closure member and the rear wall panel of the receptacle for operatively connecting the closure member to the rear wall panel, and
4. a rolling hinge portion connected to the slide portion and the closure member by respective score lines and comprising at least two folding panels positioned between the slide portion and the receptacle, the folding panels being foldable to a first position to permit the movement of the slide portion away from the top of the receptacle to open a closure member and to a second position to actuate the closure member into closing relation to the open top of the receptacle, in the second position, the slide portion is moved to the top of the receptacle and encompasses the closure member.

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**3,977,521**

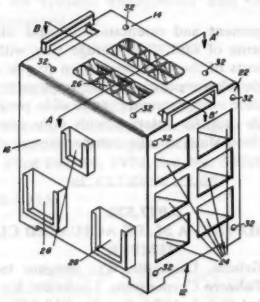
## NOVEL BASEBALL EQUIPMENT STORAGE DEVICE

**Helen M. Murphy, 43 Argyle St., Melrose, Mass. 02176**

**Filed June 3, 1974, Ser. No. 475,871**

**Int. Cl.² A47B** *81/00*; **A63B** *71/06*; **B65D** *1/24*, *25/28*; **G09F** *7/10*

**U.S. Cl. 206—315 R** **1 Claim**



**1.** An integral baseball equipment storage device and scoreboard which comprises a substantially rectangular enclosure defined by top and bottom members, said top member having a well which comprises a plurality of individual compartments each of which can retain a baseball; a first pair of solid opposed side members, a second pair of opposed side members, at least one of which is open; a plurality of compartments accessable through said open side member and extending between said first pair of side members so that each compartment can retain a plurality of baseball bats; display means positioned on at least one member of said first pair of side members, said display means being capable of displaying and interchangably retaining a medium bearing information relating to the progress of a baseball game; storage means positioned on the second member of said first pair of opposed side members for storing a scorebook or other small equipment; and means integrated with said storage device for transporting said device from place to place.

**3,977,522**

## PACKING CONTAINING ELECTRICAL COMPONENTS

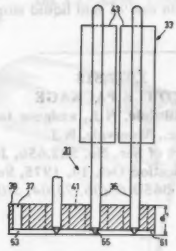
**Cornelis Gualtherus Josephus van der Aker, Geldrop; Jan Faber, and Nelis van de Sluis, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 338,075, March 5, 1973. This application Nov. 18, 1974, Ser. No. 524,705**

**Claims priority, application Netherlands, Aug. 3, 1972, 7210634**

**Int. Cl.² B65D** *73/02*, *85/42*, *85/28*

**U.S. Cl. 206—330** **3 Claims**



**1.** A packing containing electrical components, comprising a plurality of electrical components, a component comprising a body portion, and connection wires extending in a first direction parallel to each other; and a strip of flexible insulating material, said strip having transverse cut-outs defining sequential sub-carrier portions, each sub-carrier portion having at least two holes therethrough, a sub-carrier and at least a corresponding component forming a sub-assembly comprising the sub-carrier and a component having its body portion in spaced relationship with the sub-carrier, end portions of the connection wires being received in the corresponding holes of the sub-carrier so as to hold said component in position and protect said end portions from lateral deformation, said sub-assembly being adapted to be cut from the strip for attachment to a mounting panel by inserting the ends of the connection wires into holes in the panel, and wherein said body portion of said component is spaced from the sub-carrier such that said sub-assembly is adapted to be attached to the panel by moving the body portion of the component toward the sub-carrier so that the connection wires pass through the holes in the sub-carrier to enter holes in the panel, whereby said sub-carrier portions of said strip are adapted to function as a spacer and insulating element on said panel.

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**3,977,523**

## STORAGE CELL ASSEMBLY

**Bernard A. Cousino, Fort Myers, Fla., assignor to Cousino Corporation, Fort Myers, Fla.**

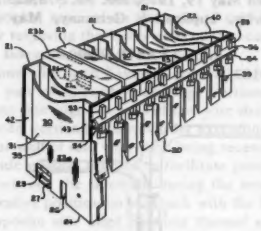
**Division of Ser. No. 414,372, Nov. 9, 1973, Pat. No. 3,885,670. This application Feb. 28, 1975, Ser. No. 553,926**

**Int. Cl.² B65D** *85/672*

**U.S. Cl. 206—387** **8 Claims**

**1.** A cartridge storage cell assembly comprising, in combination, a storage case including a panel having a top loading recess defined adjacent its upper end and a bottom loading recess defined adjacent its lower edge, first and second sidewalls integrally attached to said panel, said first sidewall being longer than said second sidewall, a flexible release finger extending downwardly from said second sidewall, an end cover panel positioned adjacent said first and second sidewalls in opposed relationship to said panel, and means on said first and second sidewalls and said end cover panel for retaining the components in an assembled relationship, said retaining

means comprising aligned retainer flanges extending outwardly from said first and second sidewalls and said end panel,



said aligned retainer flanges defining retainer grooves for receiving a retainer member.

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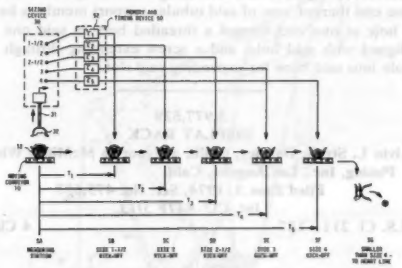
3,977,524

## AUTOMATIC CELERY SIZER AND SORTER

Vernie A. Boots, Belle Glade, Fla., assignor to A. Duda & Sons, Oviedo, Fla.

Filed May 20, 1974, Ser. No. 471,589
Int. Cl.[2] G01B 5/02; B07C 5/04
U.S. Cl. 209—74 M 20 Claims



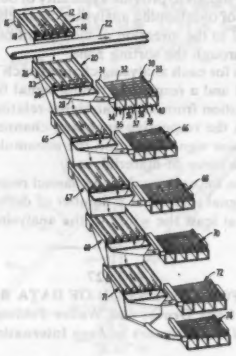
1. A device for automatically sizing loosely formed articles such as celery stalks or the like into a plurality of size groups without damage thereto, comprising a measuring station, conveying means mounted for movement past said measuring station, article holders disposed at spaced intervals along said conveying means and movable therewith, article sizing means at said measuring station, said sizing means having a plurality of arms, each of said arms including a pliable, inextensible contact surface whereby said contact surface can partially conform to the shape of such articles without damage to such articles, with the operation of said sizing means being timed to coincide with the speed of said conveying means such that each article held in said holders can be physically contacted by said contact surface of one of said arms, the latter operation being utilized to determine the size group to which each article moving in said holders belongs, control means at said measuring station operatively connected to said article sizing means, and article removal means for causing the removal of such articles from said article holders at a plurality of locations along said conveying means, said removal means being connected to and operated by said control means, such that the removal of articles from said holders can be accomplished at preascertained locations in accordance with their physical size.

3,977,525

## MECHANICAL REMOVAL OF FLAT POD ROGUES FROM SNAP BEAN SEED

Calvin R. Lamborn, Twin Falls, Idaho, assignor to Gallatin Valley Seed Co., Twin Falls, Idaho

Filed Sept. 17, 1975, Ser. No. 613,985
Int. Cl.[2] B07C 1/10; B07B 13/04
U.S. Cl. 209—75 9 Claims



1. The method of separating flat pod rogue bean seeds from normal bean seeds comprising the steps of:

a. passing the seeds through a series of screens, said screens having substantially round holes, each of said screens having holes of decreasing size, whereby said seeds are divided into a plurality of size groups, and

b. passing each individual size group onto individual slotted screens, said slotted screens having slots narrower than the diameter of the round holes through which that size category passed whereby flat pod rogue beans will fall through said slots, and normal, round beans will be retained on said slotted screen.

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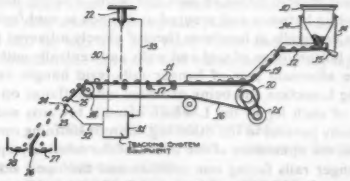
3,977,526

## TRACKING SYSTEMS FOR SORTING APPARATUS

Roderick J. Gordon, Peterborough, Canada, and Hilton P. Gordon, Johannesburg, South Africa, assignors to Sphere Investments Limited, Nassau, Bahamas

Filed June 27, 1975, Ser. No. 591,230
Int. Cl.[2] B07C 5/10
U.S. Cl. 209—111.7 R 19 Claims



1. A tracking system for a sorting apparatus for sorting pieces of material moving through a sorting zone in a wide path random stream, comprising

scanning means to make repeated scans across the sorting zone to detect light reflected from discrete areas of each piece of material as the scan traverses the piece of material and to provide a scan signal representative of the reflected light,

a plurality of deflection devices downstream of said scanning means extending across said sorting zone, each device having a first condition which permits pieces of material passing it to follow a predetermined undeflected path and a second condition in which passing pieces of material are deflected from said predetermined path,

electronic means generating timing signals, first timing control means receiving said timing signals to provide scan control signals to control the rate at which the scan traverse the sorting zone, second timing control means receiving said timing signals to provide a plurality of outputs defining a plurality of overlapping analysing channels each extending parallel to the direction of movement of the pieces of material through the sorting zone,

circuit means for each analysing channel each receiving said scan signal and a respective timing signal for accumulating information from said scan signal relating to pieces of material in the respective analysing channel and providing a decision signal based on the accumulated information from a piece of material, and

control means for each analysing channel responsive to said decision signal to actuate a number of deflection devices extending at least the width of the analysing channel.

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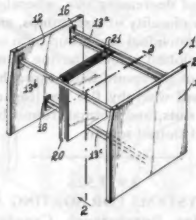
**3,977,527**

## FRAME FOR SUSPENSION OF DATA BINDERS

**Allen J. Rose, Long Grove, and Walter Feldmahr, Highland Park, both of Ill., assignors to Acco International Inc., Chicago, Ill.**

**Filed Dec. 17, 1974, Ser. No. 533,678**
**Int. Cl.² B42F *15/04*; A47F *5/08***
**U.S. Cl. 211—46** **3 Claims**



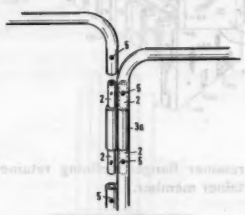
1. An invertible rack structure comprising upstanding, spaced-apart, substantially square end walls, a pair of laterally spaced-apart hanger rails extending between and secured at their ends to the facing sides of said end walls at locations thereof closely adjacent the relatively upper-outer corners of said end walls and in a horizontal plane which is parallel to the top and bottom edges of said end walls, a single hanger rail extending between and secured at its ends to said facing sides of the end walls at locations thereof closely adjacent the relatively bottom edge of said end walls and centrally with respect to the aforesaid pair of hanger rails, said hanger rails each having L-section and being provided with a flange on the free edge of each leg of the L which extends towards and is substantially parallel to the other leg, thereby defining open-sided tracks, the open sides of the tracks of the relatively upper pair of hanger rails facing one another and the open side of the track provided by the single, centrally disposed hanger rail facing the relatively bottom edges of said end walls, the construction and arrangement being such that at least one data binder provided with end hooks may be hung from said pair of laterally spaced-apart hanger rails and that, upon inversion of the rack structure, at least one data binder may be hung from one of its said hooks in angular position from said single, centrally disposed hanger rail.

**3,977,528**

## RACK HAVING SUPPORTING TUBES CONNECTED BY MEANS OF RELEASABLE COUPLINGS

**Volker Ernst Uwe Berger, Mombris, Germany, assignor to Orschler Produktion KG, Stockstadt, Germany**

**Filed May 19, 1975, Ser. No. 578,625**
**Claims priority, application Germany, May 21, 1974, 7417684[U]**
**Int. Cl.² A47B *97/00***
**U.S. Cl. 211—182** **5 Claims**



1. A rack assembly having tubular support members and tubular coupling means having equal inside diameters, coupling portions having outside diameters equal to said inside diameters for joining selective ones of said support members to selected ones of said tubular coupling means, said tubular coupling means including units thereof having at least two tube members fixedly joined in adjacent parallel relation to each other, said coupling portions including at least one unit thereof having an axially extending bifurcating slot at at least one end thereof, one of said tubular support members having a hole at one end thereof a threaded bore in said one unit aligned with said hole, and a screw extending through said hole into said bore for expanding said slot.

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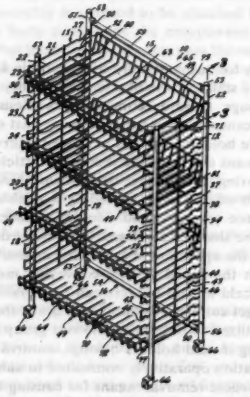
**3,977,529**

## DISPLAY RACK

**Alvin L. Stroh, Downey, Calif., assignor to McMillin Wire & Plating, Inc., Los Angeles, Calif.**

**Filed June 3, 1974, Ser. No. 475,657**
**Int. Cl.² A47F *5/13***
**U.S. Cl. 211—187** **4 Claims**



1. A display rack comprising:

a pair of oppositely disposed sidewalls, each said sidewall including spaced front and rear upright posts interconnected by a plurality of generally horizontally disposed vertically spaced wire support elements, each said sup-

port element having a pair of spaced horizontally inwardly extending offset portions;

upper and lower longitudinally extending spreader bars;

upright socket means secured on the ends of said upper spreader bar for receiving the upper ends of the rear upright posts of the sidewalls;

upright socket secured on the ends of said lower spreader bar for receiving the lower ends of the rear upright posts of the sidewalls; and

at least one wire shelf having a generally upright rear wall and a pair of opposite side edge portions, each of the opposite side edge portions of said wire shelf having a pair of spaced vertically downwardly extending lug portions, the rear wall of said wire shelf being recessed inwardly at each side portion thereof to facilitate positioning of said shelf between the sidewalls during the mounting thereof in operative position on said rack with the lug portions on the opposite side edge portions thereof engaging offset portions on oppositely disposed wire support elements on said sidewalls.

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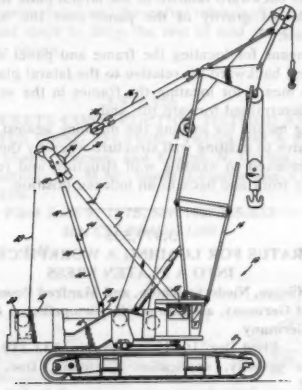
**3,977,530**

## CRANE WITH GANTRY BACKHITCH AND BOOM HOIST ASSEMBLY REMOVABLE AS A UNIT

**Percy R. Helm; James G. Morrow, Sr., and David J. Pech, all of Manitowoc, Wis., assignors to The Manitowoc Company, Inc., Manitowoc, Wis.**

**Filed June 13, 1974, Ser. No. 478,978**
**Int. Cl.² B66C *1/12***
**U.S. Cl. 212—46 R** **3 Claims**



1. In a crane having a rotating bed carrying an upper machinery cab and a boom pivoted for vertical movement, a subassembly for vertically positioning said boom comprising, in combination, a gantry secured to said bed and pivoted for movement between an upright working position and a transport position overlying said cab, a backhitch pivotally secured to said bed and said gantry to resist movement of the gantry toward said boom, said backhitch being selectively collapsible so that said gantry can be pivoted to said transport position with the backhitch lying beneath the gantry, a boom hoist assembly removably mounted on said bed within the cab and including a motor and a drum, said motor being coupled to said drum, boom rigging including a pair of equalizer assemblies secured respectively to said gantry and said boom and a line wound on said drum and running between said equalizer assemblies, means intermediate the ends of the gantry for locking the gantry and backhitch together when the former is in said transport position, and means including a link for locking said hoist assembly to the locked gantry and backhitch, said gantry, said backhitch and said boom hoist assembly being selectively releasable from said bed so that the interlocked gantry, backhitch and hoist assembly can be separated from the bed and cab and handled as a unit without unreeving the boom rigging.

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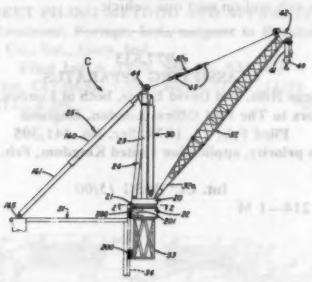
**3,977,531**

## STIFF-LEG CRANE

**Jack J. Brewer, Grapevine, Tex., assignor to Sam P. Wallace Company, Inc., Dallas, Tex.**

**Continuation-in-part of Ser. No. 356,995, May 3, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 554,483**
**Int. Cl.² B66C *23/06***
**U.S. Cl. 212—59 R** **9 Claims**



1. A stiff leg crane comprising: an annular thrust bearing providing a rotatable support for said crane; a mounting means secured with said thrust bearing for mounting said crane on support structure; a crane base platform secured on said thrust bearing for rotation through 360° on said bearing; a vertical mast secured in a rigid non-pivoting relationship along a lower end thereof into said base platform and extending upwardly therefrom said mast having a longitudinal axis coincident with the axis of rotation of said base platform; a boom pivotally mounted at a foot end on said base platform and movable about a substantially horizontal axis at said foot end to any one of a plurality of angles between substantially vertical and below horizontal; means connected with said boom for raising and lowering said boom and supporting said boom at a desired angle of inclination; line means connected with said boom for supporting a load from the free end of said boom; and bracing means including a pair of lay legs each connected at upper ends thereof with said mast near the upper portion thereof for pivotal movement relative to said mast in vertical planes and for rotational movement around said mast whereby each of said lay legs may be positioned at any desired location in a circle around said mast and may be pivoted in vertical planes relative to said mast to any desired angular position relative to said mast for connection with support structure spaced from said base platform, said lay legs being adapted to fold inwardly along said mast for relative rotation between said lay legs and said mast, boom, and base platform without interference between said boom and said lay legs.

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**3,977,532**

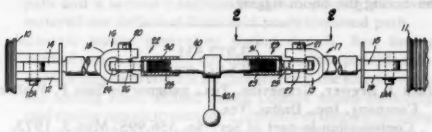
## TRAIN COUPLING SYSTEM

**Kenneth V. Hackman, Monrovia, Calif., assignor to Southwest Products Co., Monrovia, Calif.**

**Filed July 28, 1975, Ser. No. 599,693**
**Int. Cl.² B61G *1/00***
**U.S. Cl. 213—208** **2 Claims**

1. A coupling arrangement for coupling two vehicles including a pair of self-aligning rod end bearings, each of said bearings including a race member and a spherical ball element moveably mounted in said race member, first means connecting the ball element of one of said pair of bearings to one of

said vehicles, second means connecting the ball element of the other one of said pair of bearings to the other one of said vehicles, and third means interconnecting the race members



of said pair of bearings, said first means including a first clevis connected to said ball element, said first clevis having a shank portion, and means pivotally mounting said shank portion about an axis and on said one vehicle.

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**3,977,533**

**CLASSIFYING APPARATUS**

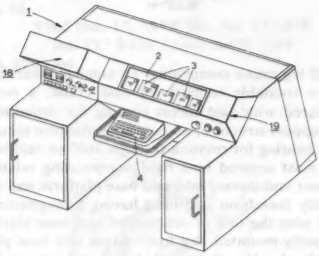
**Eric George Hills, and David Evans, both of London, England, assignors to The Post Office, London, England**

**Filed Feb. 11, 1974, Ser. No. 441,305**

**Claims priority, application United Kingdom, Feb. 13, 1973, 6919/73**

**Int. Cl.² B65G** *15/00*

**U.S. Cl. 214—1 M** **12 Claims**



1. Article classifying apparatus comprising:

conveying means for conveying articles seriatim from an input station past a work station to an output station;

code establishing means at the work station for establishing classification codes in the form of machine-readable signals specific to successive ones of the articles according to the identities thereof;

monitoring means for monitoring the position of the foremost article for which a code has not been established; and

control means simultaneously under the control of said code establishing means and said monitoring means for varying the speed of the conveying means in accordance with the position of said foremost article so that if a code is established for that article when it is near the input station, said conveying means moves faster than if a code is established for that article when it is near the output station.

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**3,977,534**

**WALL INDEXING MACHINE**

**William R. Blake, Tulsa, Okla., assignor to Aquarius, Inc., Tulsa, Okla.**

**Filed Oct. 15, 1974, Ser. No. 515,050**

**Int. Cl.² E04F** *21/18*

**U.S. Cl. 214—1 H** **20 Claims**

1. A pneumatically operable wall panel indexing and installing machine comprising in combination,

a base chassis including wheels;

a lateral plate carried by the chassis;

means to move the lateral plate laterally of the chassis;

a first frame pivotally secured to the forward end of the lateral plate;

a second frame;

means for lifting and lowering the second frame relative to the first frame;

a third frame adapted to grip a wall panel;

means for reciprocally moving the third frame at an angle of 45° relative to the second frame;

means for tilting the first, second and third frames with the panel backward relative to the lateral plate to locate the center of gravity of the panel over the base chassis wheels;

stop means for locating the frame and panel in predetermined backward tilt relative to the lateral plate;

plumb means for locating the frames in the vertical or at predetermined forward tilt; and,

locking means for locking the machine against movement relative to existing wall structure whereby the panel may be indexed to existing wall structure and reciprocated away from and back to an indexed position.

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**3,977,535**

**APPARATUS FOR LOADING A WORKPIECE STACK INTO A PLATEN PRESS**

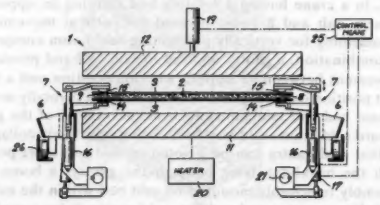
**Walter Hüsges, Niederkruchten, and Manfred Posselt, Viersen, both of Germany, assignors to G. Siempelkamp & Co., Krefeld, Germany**

**Filed Dec. 16, 1974, Ser. No. 533,219**

**Claims priority, application Germany, Dec. 21, 1973, 2363795**

**Int. Cl.² B66C** *1/22*

**U.S. Cl. 214—1 BB** **1 Claim**




1. The combination, with a platen press and an assembly table horizontally spaced from said press for assembling a stack of sheets for the formation of a laminated board wherein the stack is transferred from said table between the platen of said press, of a stack-transfer device which comprises:

a pair of horizontal beams horizontally spaced apart and adapted to flank said table and said press;

guide means forming a horizontal longitudinal transport path for said beams between a pickup position wherein said beams lie adjacent said table and a deposit position wherein said beams lie adjacent said press;

at least one clamp arrangement mounted on each of said beams for engagement with opposite edges of said stack in said pickup position and adapted to release said stack in said deposit position, each of said clamp arrangements comprising:

a double-arm angular lever fulcrumed on a respective horizontal axis to the respective beam;

a pair of clamp jaws mounted on one of the arms of said lever and adapted to grip the respective edge of the stack between them;

actuation means on said one of said arms for displacing one of said jaws toward and away from the other of said jaws for respectively engaging and releasing the respective edge of said stack, and

a fluid-responsive piston-and-cylinder mechanism of each beam operatively connected to the other arm of the respective lever for swinging same between laminating positions wherein said jaws are withdrawn laterally from between platens of said press, respectively;

control means synchronously operating said press, said actuating means and said fluid responsive mechanism for successively:

opening the jaws of one of said clamp arrangements,

swinging the jaws thereof out from between said platens,

opening the jaws of the other clamp arrangement and swinging the jaws thereof out from between the press platens for each cycle of press closure, said control means releasing one of said edges to drop same onto the lower platen and thereafter releasing the other edge of said stack to drop the rest of said stack onto said lower platen.

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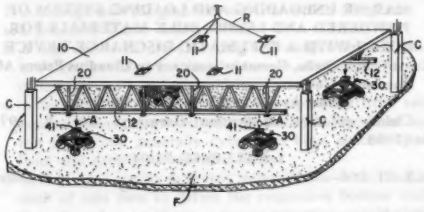
**3,977,536**

## CONCRETE CONSTRUCTION METHOD AND APPARATUS USING "FLYING" TRUSS DECK FORMS

**S. Thomas Moore, Tucson, and Eugene N. Carlier, Phoenix, Ariz., assignors to M.M. Sundt Construction Company, Tucson, Ariz.**

**Filed June 9, 1975, Ser. No. 585,433**
**Int. Cl.² E04G *21/00***
**U.S. Cl. 214—1 H** **4 Claims**




1. Apparatus for handling a flying deck form for construction of successive floors supported on columns in a poured concrete building, the deck form having underlying trusses extending downwardly through a vertical height which is a substantial fraction of the separation between floor levels, the apparatus comprising:

a. a plurality of shore jacks having outer sleeve members vertically mounted in spaced relation on the trusses of the form and each ending above the bottoms of the trusses, and the jacks having slide members telescopically retractable upwardly within the sleeve members to a level above the bottoms of the trusses; and

b. a plurality of dollies for supporting the deck forms and for moving them horizontally and vertically, each dolly comprising a frame having caster-mounted floor-engaging wheels; a dolly jack having a fixed jack member mounted vertically on the frame and having a movable jack member cooperating with said fixed member for vertical movement, and having truss-receiving means on said movable jack member for engaging the bottom of a truss; and means on the dolly for operating the dolly jack to raise the truss-receiving means from a downwardly retracted position in which its height above the floor plus the height of a truss is less than said separation between floor levels to an extended jack position in which the height of the truss-receiving means plus the height of a truss is at least as great as said separation between floor levels.

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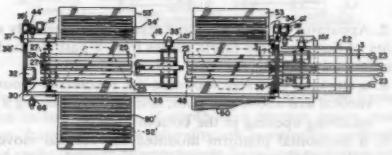
**3,977,537**

## SHEET PILING METHOD AND APPARATUS

**Velio S. Buccicone, Portage, Ind., assignor to Bucciconi Engineering Co., Inc., Gary, Ind.**

**Filed Jan. 6, 1975, Ser. No. 538,563**
**Int. Cl.² B65G *57/04*; B65H *31/20*, *31/36***
**U.S. Cl. 214—6 DS** **19 Claims**



1. In a piling machine for handling metal sheets having means defining a pile receiving area with pile supporting means therein, an infeed conveyor means for delivering successive sheets to the entrance end of said pile receiving area, and overhead conveyor means extending above said pile receiving area for advancing the sheets delivered by said infeed conveyor for deposit in said piling area, which conveyor means has associated, adjustable end stop, back stop and side guide mechanisms operative normally to deposit sheets of predetermined dimensional limits in a single pile on said pile supporting means in said piling area: an auxiliary sheet edge guide unit adapted for co-operation with said overhead conveyor means and said associated mechanisms to deposit sheets in a multiplicity of piles in said piling area, means adjustably mounting said auxiliary edge guide unit on said machine adjacent the entrance end of said pile receiving area for movement into and out of operative position relative to said pile receiving area so as to co-operate with said overhead conveyor and its associated end stop and back stop mechanisms and said pile supporting means in depositing sheets in one or more piles in said piling area, said auxiliary edge guide unit including sheet edge guide members which are adjustably mounted on said auxiliary edge guide unit so as to enable said auxiliary edge guide unit, when it is positioned for co-operation with said pile supporting means, to be operated to selectively deposit a plurality of separate piles of sheets in said pile receiving area in side-by-side or in end-to-end relation when the sheets delivered by said infeed conveyor means to said auxiliary sheet edge guide unit are of substantially lesser dimensions than the maximum dimensions of the sheets which the machine normally operates to pile in a single pile on said pile supporting means.

3,977,538

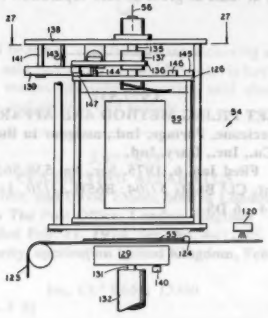
## APPARATUS FOR MANUFACTURING AND STACKING HEMMED FABRIC PIECES

Douglas J. Crawford, Troy; Roger LeMere, Petersburg, and Francis H. Hughes, Troy, all of N.Y., assignors to Cluett, Peabody & Co., Inc., New York, N.Y.

Division of Ser. No. 344,227, March 23, 1975, Pat. No. 3,898,941. This application Apr. 23, 1975, Ser. No. 570,811

Int. Cl.² B65G 57/16, 57/30

U.S. Cl. 214—6.5 3 Claims



2. Apparatus for receiving and stacking sequentially a plurality of hemmed limp fabric pieces from a path defined by a continuously moving conveyor, characterized by

a. a stacking cartridge mounted for revolution around its vertical axis above said path, said cartridge having a piece receiving opening in the bottom thereof;

b. a horizontal platform mounted for vertical movement below said cartridge from an upper position in said cartridge bottom opening to a lower position below the upper surface of said path;

c. said horizontal platform being configured to straddle said path in the upper position thereof to engage sequentially said limp fabric pieces on said conveyor and raise them through said bottom opening;

d. means for revolving said cartridge as each successive hemmed fabric piece is inserted therein, wherein uneven height resulting from the hems is distributed peripherally thereabout;

e. a horizontal flange surrounding said bottom opening;

f. said horizontal platform being smaller than said fabric pieces and said bottom opening whereby each fabric piece is deformed as it passes through said opening and then relaxes so that upon movement of said platform to its lower position the fabric pieces sit on said horizontal flange whereby each fabric piece is deformed as it passes through said opening and then relaxes so that upon movement of said platform to its lower position the fabric pieces sit on said horizontal flange.

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3,977,539

## ARRANGEMENT FOR INSERTING PARTS TO BE MACHINED IN A CLAMPING FRAME

Wilhelm Hauschild, Feldkirchen, Germany, assignor to Schleif- u. Poliermaschinenbau GmbH, Germany

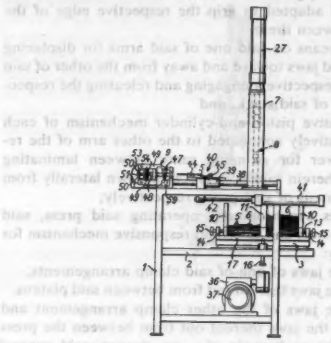
Continuation of Ser. No. 430,058, Jan. 2, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,028

Claims priority, application Germany, Jan. 5, 1973, 2300440

Int. Cl.² B65G 59/04

U.S. Cl. 214—8.5 D 13 Claims

1. An arrangement for inserting substantially elongated parts to be machined in a clamping frame comprising, in combination, magazine means having adjacently-lying stacks of parts to be machined; gripping means movable downward on said stacks in said magazine means, and having at least one gripping element for gripping simultaneously the upper parts in each stack; a clamping frame with support means cooperating with said gripping means for taking, when open, parts in their longitudinal directions after having been picked up by said gripping means, the uppermost parts in said stack being gripped simultaneously in unison by said gripping means and placed simultaneously in said clamping frame for becoming machined; transfer means between said gripping means and said clamping frame for transferring said parts when said gripping means and said clamping frame are stationary; means



for moving said magazine means with respect to said gripping means in a loading position of said magazine means, said magazine means havng a displaceable frontal wall corresponding to the length of said parts; a rotatable platen for supporting at least two magazine means, said gripping means comprising a movable up-and-down member, said gripping means having gripping elements comprising suction heads; a suction pump with control valve means connected to said suction heads; means for displacing and interchanging said suction heads; drive means for automatically closing said clamping means; and means for automatically controlling the motion and sequential operation of at least part of said arrangement.

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3,977,540

## MARINE UNLOADING AND LOADING SYSTEM OF POWDERED AND LUMPY BULK MATERIALS FOR HOLDS WITH A PNEUMATIC DISCHARGE DEVICE

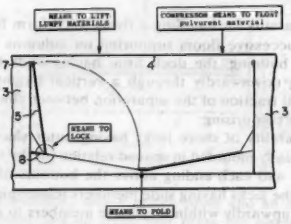
Ernst Gaser, Stelle, Germany, assignor to Claudius Peters AG, Hamburg, Germany

Filed Apr. 4, 1975, Ser. No. 565,053

Claims priority, application Germany, Apr. 8, 1974, 2417098

Int. Cl.² B65G 53/04

U.S. Cl. 214—14 8 Claims




1. In a marine loading system of powdered bulk materials and also lumpy materials for ships, barges and similar transport vehicles having large rectangular cargo holds with a

ceiling and conventional means to load and unload lumpy materials,

a pneumatic discharge means of powdered materials comprising:

powdered materials air flotation means and

open-air conveyer chutes connected to said pneumatic discharge means for advancing said powdered material,

said flotation means and said chutes located at the bottom of said hold, foldably attached thereto, and

means to fold said floatation means and conveyer chutes upwardly out of the loading way of said hold to allow for loading or unloading of said lumpy materials.

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3,977,541

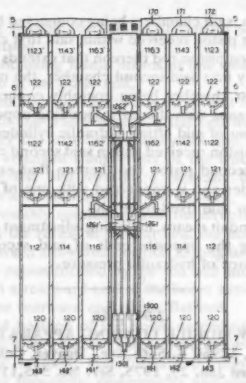
## STORAGE STRUCTURE FOR GRANULAR MATERIALS

Robert George Watson, 95 Glengowan Road, Toronto, Ontario, M4N 1G5, Canada

Continuation-in-part of Ser. No. 437,855, Jan. 30, 1974, abandoned. This application Apr. 17, 1975, Ser. No. 569,093

Int. Cl.² E04H 7/22

U.S. Cl. 214—16 R 10 Claims



1. A storage unit for granular material which comprises:

a. a generally planar base structure;

b. a first wall structure extending upwardly from said base to define connected vertical sidewalls of at least one row of first generally cylindrical bins;

c. a second wall structure extending upwardly from said base to define connected vertical sidewalls of at least one row of second generally cylindrical bins, spaced apart from and parallel to said first bins;

d. first hopper means mounted adjacent the lower end of each of said bins to define the respective bottom ends thereof; and second hopper means mounted on said vertical wall in a spaced apart relationship above said first hopper means to define upper and lower bins, said first and second hopper means each having discharge control means aligned one with the other;

e. each said hopper means having substantially horizontal load-bearing elements mounted in substantially zero hoop-tension relationship with said vertical walls;

f. wall openings in each of said vertical walls aligned with said discharge control means to define a conveyor passageway;

g. lower conveyor means extending through said passage to receive and convey material discharged from said bins to an outgoing weigh station;

h. an in-going weigh station;

i. elevator means for raising material from said in-going weigh station to said bin tops;

j. upper conveyor means for conveying said material from said elevator means to a selected one of said bins; and

k. cleaning means disposed between opposed vertical sidewalls of said first and second rows of bins and communicable with said upper and lower bins thereof.

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3,977,542

## STORAGE FRAMES WITH DEFLECTION BAR TO PIVOT TINES ON A GANTRY

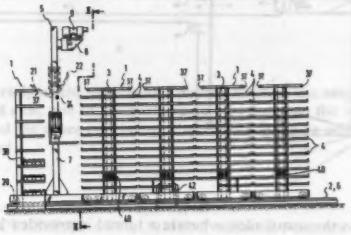
Paul Stolzer, Achern, Germany, assignor to STOPA Stahlbau GmbH & Co. Kommanditgesellschaft fur Schweisstechnik, Achern-Gamshurst, Germany

Filed May 31, 1974, Ser. No. 475,242

Claims priority, application Germany, July 26, 1973, 2337907

Int. Cl.² B65G 1/06

U.S. Cl. 214—16.4 A 13 Claims



1. In a storage system including a plurality of storage frames aligned in the direction of depth of a storage space, each storage frame having a plurality of horizontal, vertically spaced racks forming compartments for accommodating articles for storage; the racks extending in the direction of depth of the storage space and having free ends; a gantry movable in the direction of depth of the storage space, the gantry having a bridge and vertical columns supporting the bridge extending above the storage frames in the direction of width of the storage space; a cross beam supported between the vertical columns of the gantry and extending in the direction of width of the storage space; article handling means carried by the cross beam for removing articles from or depositing articles onto selected ones of the racks; and a hoisting mechanism for vertically raising said cross beam beyond the height of said storage frames and for lowering said cross beam into the space between two selected ones of said storage frames; the improvement comprising in combination:

a. a plurality of tines each formed of two tine arms joining one another substantially at right angles; said tines forming said article handling means;

b. support means for mounting each said tine on said cross beam for displacement therealong;

c. means for pivotally securing each said tine to the respective support means to provide for a swinging movement of each tine in a plane parallel to the direction of depth of the storage place through an angle of approximately 90°, whereby each tine has two mutually perpendicular positions in each of which one of the tine arms extends substantially horizontally in the direction of depth of the storage space and the other of the tine arms extends substantially vertically upwardly; and

d. a deflection bar affixed to each storage frame above the uppermost racks thereof, said deflection bar extending parallel to said cross beam and perpendicularly to said racks and being arranged for cooperating with said tines by abutting the horizontally extending tine arms during lowering of said cross beams from above said storage frames for swinging the tines from one of their positions into the other, whereby said tines are moved to a load receiving position when they are lowered between two

storage frames; said deflection bars being recessed with respect to the free ends of the racks.

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**3,977,543**

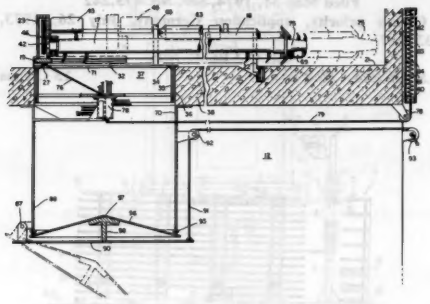
**APPARATUS FOR DISCHARGING SILAGE FROM A SILO**

**Richard L. Weaver, Rte. 1, Myerstown, Pa. 17067**

**Division of Ser. No. 354,496, April 26, 1974, Pat. No. 3,874,524, and a continuation-in-part of Ser. No. 218,736, Jan. 18, 1972, and Ser. No. 283,384, Aug. 24, 1972, Pat. No. 3,817,409. This application Nov. 25, 1974, Ser. No. 526,690**

**Int. Cl.² B65G 65/46**

**U.S. Cl. 214—17 DA** **1 Claim**



1. In the art of silos, wherein a tunnel is provided beneath the silo for receipt of silage delivered thereto by a bottom unloader, wherein the unloader is of the type comprising a generally radially disposed auger located at the bottom of the silo above the floor thereof and having cutting means thereon for conveying silage radially inwardly toward a dischargeway as the auger sweeps in an arc, generally parallel to the floor of the silo about a generally central sweep axis, a silage dischargeway between a silo and the tunnel, the silage dischargeway comprising a duct in generally concentric vertical disposition beneath a generally central opening in the silo floor, said duct having a generally transversely disposed bottom plate at an end thereof that is adapted to be the lower end of the passageway when installed, said bottom plate being provided with means hingedly connecting it to said duct, and with said bottom plate being movable between a first position of transverse disposition relative to the duct in which said duct is in closed-off condition by the bottom plate, and a second position in which the bottom plate is in removed disposition relative to said duct end, also including sealing means carried by one of said duct and said bottom plate for facilitating a tightly sealed engagement therebetween, and including means disposed outside the silo and connected to said bottom plate for effecting movement of said plate, for opening and closing the dischargeway for hingedly moving the bottom plate from a position remote thereto, outside said silo, wherein said bottom plate is conically configured upwardly into said dischargeway, and wherein said means disposed outside the silo includes pulley means disposed outside said dischargeway, crank means outside said silo, and cable means disposed between said crank means and said bottom plate over said pulley means.

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**3,977,544**

**ENTIRELY HYDRAULIC LOADING PLATFORM FOR TRUCKS**

**Omer A. E. D'Hollander, Gentstraat 25 A, 9180 Belsele, Belgium**

**Filed Feb. 11, 1975, Ser. No. 549,024**

**Int. Cl.² B60P 1/44**

**U.S. Cl. 214—77 P** **4 Claims**

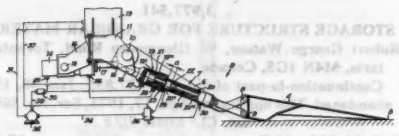
1. An entirely hydraulic loading platform assembly for trucks, including:

a. a loading platform;

b. lever arm means pivotally mounting said loading platform to a fixed base;

c. lifting hydraulic cylinder means connected between said fixed base and said lever arm means, and operable to raise and lower said loading platform;

d. adjustment hydraulic cylinder means connected between said fixed base and said loading platform, and operable to effect adjustments in the attitude assumed by said platform, said lever arm means and said adjustment hydraulic cylinder means forming a parallelogram system, and said adjustment hydraulic cylinder means comprising: at least one cylinder having a first chamber and a second chamber therein, said chambers being connected by a passageway; a first piston received within said first chamber, and having a first piston rod thereon that extends through said passageway into said second chamber, the opposite ends of said first chamber being operably connected by first conduit means with the corresponding opposite ends of the chamber of said lifting hydraulic cylinder means; and a second piston received within said second chamber, and having a second piston rod thereon that extends out of said cylinder and is connected with one of said loading platform or said fixed base; and



e. second conduit means, including adjustment valve means, connecting the opposite ends of said second chamber with a source of hydraulic pressure.

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**3,977,545**

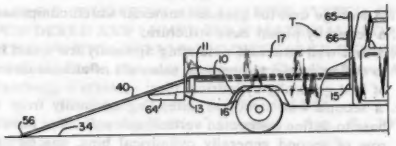
**SNOWMOBILE LOADING APPARATUS**

**John B. Lloyd, 12960 E. 55th Ave., Denver, Colo. 80239**

**Filed Jan. 29, 1975, Ser. No. 545,118**

**Int. Cl.² B65G 67/02**

**U.S. Cl. 214—85** **22 Claims**



1. A loading apparatus adaptable for loading and unloading vehicles onto and from the bed of a pickup truck and the like comprising:

a platform rigidly attached in spaced relation above the bed of a pickup truck, said platform including ramp section housing means mounted beneath said platform;

loading ramp means including a pair of elongated rigid ramp sections adapted to be removably connected to said ramp section housing means for rearward and downward angular extension therefrom whereby to facilitate loading vehicles onto and from said platform, said loading ramp means including connector means interchangeably and removably connecting said loading ramp means to said ramp section housing means, each of said ramp sections being defined by a pressed steel member of oblong shape, the sides of each section having inwardly facing channels, the front end of each section having a shaft extending transversely at each end between said inwardly facing side channels and spaced under the front edge of said

ramp section, and handles attached to and extending from the rear ends of each section; and

said ramp section housing means including slidable support means for receiving and releasably holding said ramp sections in a storage position beneath said platform when not in use.

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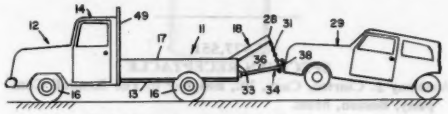
3,977,546

## WRECKING AND HAULING TRUCK

Richard Loza, 289 Twin View Drive, Pleasant Hill, Calif. 94523

Filed Nov. 7, 1974, Ser. No. 521,645
Int. Cl.² B60P 3/12
U.S. Cl. 214—86 A 4 Claims




1. A truck suitable for hauling and/or for wrecking operations, comprising

a chassis including frame means at one end and an operator's cab at the other end,

a fabricated body unit including structural framework connected to the frame means, a flat bed horizontally supported by the structural framework and an upright bed portion arranged transversely of the truck adjacent the cab, the flat bed forming a centrally disposed recess adjacent a rearward end of the flat bed,

a boom pivotably connected with the structural framework adjacent the recess in the flat bed, the boom being movable between a lowered position in longitudinal alignment with the recess formed by the flat bed and an erect position with a rearward end of the boom extending past and above the rearward end of the flat bed,

the forward position of the boom extending in offset relation from a longitudinal plane of the boom to form a first mounting bracket, said forward portion of the boom extending forwardly, downwardly and upwardly relative to the longitudinal plane of the boom,

a second mounting bracket being formed by the structural framework generally in longitudinal alignment with the boom in the lowered position,

towing means arranged upon the rearward end of the boom for supporting a load,

motor means being interconnected between the first and second mounting brackets, said boom being mounted for movement at a pivot located rearwardly of the second mounting bracket and adjacent the first mounting bracket,

control means for operating the motor means and selectively moving the boom between its lowered and erect positions.

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3,977,547

## MATERIAL HANDLING APPARATUS

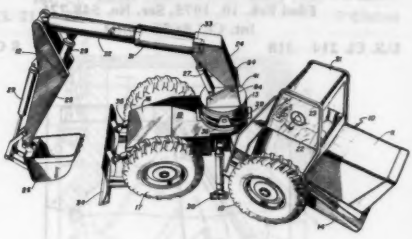
Vaino J. Holopainen, c/o Channel Construction, Inc., P.O. Box 668, Troy Road, Keene, N.H. 03431

Division of Ser. No. 150,347, June 7, 1971, Pat. No. 3,807,586.
This application Mar. 26, 1974, Ser. No. 454,859
The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.
Int. Cl.² E02F 3/00
U.S. Cl. 214—131 R 7 Claims

1. Material handling apparatus, comprising

a. a vehicle consisting of a front wheeled portion and a rear wheeled portion joined for articulation about a vertical axis lying between the wheels, the rear wheeled portion having an operator's seat and controls, and

b. a junction element mounted on the front wheeled portion in the vicinity of the said axis and consisting of two parts joined for relative rotation about an axis extending transversely of the vehicle and passing through the said vertical axis, one of the parts being connected to the vehicle and the other part being adapted to receive an accessory tool.



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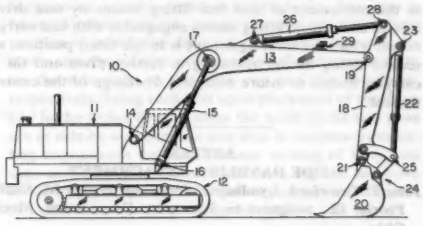
3,977,548

## CYLINDER ATTACHMENT MEANS FOR AN EXCAVATOR AND METHOD FOR USING THE SAME

Michael Benjamin McCannon, Sugar Grove, and Richard Charles Zielie, North Aurora, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 24, 1974, Ser. No. 517,423
Int. Cl.² E02F 3/32
U.S. Cl. 214—138 R 6 Claims



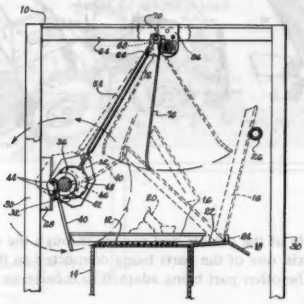

1. In a construction vehicle comprising a boom having a first end thereof pivotally mounted on a frame of said vehicle, actuating means pivotally interconnected between said frame and said boom for selectively raising or lowering said boom, a dipper arm having first means on an upper end thereof and pivotally mounted intermediate its ends of a second end of said boom, a work tool mounted on a lower end of said dipper arm, a first end of a double-acting hydraulic cylinder pivotally mounted on said boom, and wherein a second end of said cylinder, having second means thereon for attachment to the first means of said dipper arm, is maintained in unattached relationship on said vehicle, the invention comprising attachment means mounted on said boom and releasably attaching said cylinder thereto in a storage position thereon, intermediate the ends of said cylinder, whereby upon release of said attachment means said first and second means can be attached together to attach the second end of said cylinder to the upper end of said dipper arm.

3,977,549

## CONSTRUCTION FOR CLEARING TABLEWARE FROM TRAYS

Ralph Ettlinger, Jr., Glencoe, and Frank J. Kostohryz, Elmhurst, both of Ill., assignors to Avant Industries, Inc., Wheeling, Ill.

Filed Feb. 10, 1975, Ser. No. 548,726
Int. Cl.² B65G 65/04
U.S. Cl. 214—318 8 Claims



1. In a construction for handling soiled tableware wherein the tableware is loaded on carrying means and moved to a station for discharge of the tableware from the carrying means, the improvement in means for discharging the tableware from the carrying means, said discharge means comprising first lifting means engageable with said carrying means, means for driving said first lifting means to tilt said carrying means, said first lifting means comprising at least one paddle, said paddle being driven into engagement with a side edge of said carrying means, and including means for restraining the opposite edge of said carrying means whereby the carrying means pivots and is tilted about said opposite edge in response to the movement of said first lifting means by said driving means, and second lifting means engageable with said carrying means while the carrying means is in the tilted position, said second lifting means operating to further pivot and tilt the carrying means to insure complete discharge of the contents thereof.

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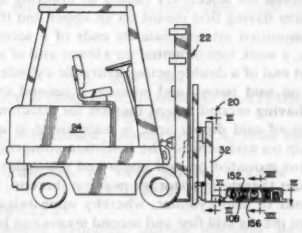
3,977,550

## SIDE HANDLING ATTACHMENT

John T. Crawford, Lyndhurst, Ohio, and Walter M. Shaffer, Peoria, Ill., assignors to Towmotor Corporation, Mentor, Ohio

Filed Nov. 18, 1974, Ser. No. 524,692
Int. Cl.² B66F 9/14
U.S. Cl. 214—730 12 Claims



5. A load handling apparatus comprising:

raisable and lowerable base means;

means for raising and lowering said base means;

track means associated with said base means;

bar means movable relative to said base means generally along said track means to an outward position relative to said base means, and to an inward position relative to said base means;

load engaging means movable relative to said base means generally along said track means to an outward position relative to said base means, and to an inward position relative to said base means;

leg means connected to said bar means and actuatable to automatically extend from the bar means as the bar means are moved to said outward position, and means for automatically retracting said leg means as said bar means are moved to said inward position.

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3,977,551

## SPECIMEN RECEPTACLE

Anthony J. Ciarico, Cary, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Nov. 10, 1975, Ser. No. 630,107
Int. Cl.² B65D 25/54
U.S. Cl. 215—1 C 13 Claims

1. A specimen receptacle comprising, a container having a chamber for retaining the specimen, a transparent lower end portion of reduced dimensions defining a lower end of the chamber of reduced configurations for collecting sediment from the specimen, and a skirt depending from the container and having a lower end edge located at least as low as the bottom of said lower end portion to support the container in an upright position, said skirt having a cut-out portion in alignment with said lower end portion to permit unobscured vision of collected sediment in the lower end portion.

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3,977,552

## PORTABLE COOLER FOR WINE AND OTHER LIQUIDS

Anthony Lombardo, c/o Architectural Panelling, Inc., 969 Third Ave., New York, N.Y. 10022

Filed Aug. 4, 1975, Ser. No. 601,485
Int. Cl.² B65D 23/08
U.S. Cl. 215—13 R 3 Claims

1. In a portable cooler for wine and other liquids, the combination of an upright cylindrical side wall, and a circular bottom wall integral therewith so to form a central chamber accessible through a top opening for receiving a wine bottle or the like, said side wall and bottom wall being comprised of a thick insulation between a plastic inner liner and a plastic outer shell, said outer shell having a sidewardly bead at a lower end of said side wall, a wooden or the like collar being affixed upon an upper end of said side wall, said collar having

a downwardly tapered central opening extending from its upper edge and a counterbored bottom opening fitting said

side wall, and an outer peripheral side of said collar being of a larger diameter than said cooler side wall.

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3,977,553

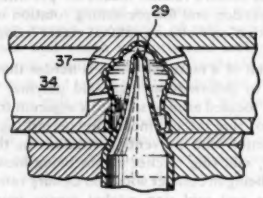
## UNITARY THERMOPLASTIC CONTAINER HAVING BREAKAWAY CAP WHICH PROTECTS STERILE INTERIOR ACCESS BARRIER

Walter G. Cornett, III, Wilmette, and Donald G. Gaspar, Burbank, both of Ill., assignors to Respiratory Care, Inc., Arlington Heights, Ill.

Division of Ser. No. 448,684, March 6, 1974, Pat. No. 3,936,264, which is a division of Ser. No. 338,878, March 7, 1973, Pat. No. 3,851,029. This application July 23, 1975, Ser. No. 598,215

Int. Cl.² B65D *1/02*

U.S. Cl. 215—32 8 Claims




1. A container fabricated from thermoplastic material comprising:

a body;

said body having at least one neck;

said neck terminating at its end distal from said body with a continuous breachable sealing membrane;

a cap covering said breachable sealing membrane;

the edges of said cap being joined to the edges of said continuous breachable sealing membrane and to the distal end of said neck;

said cap having a weakened portion between the portion of said cap proximal to said breachable sealing membrane and the portion of said cap distal thereto, whereby said distal portion of said cap may be readily broken away, by rupturing of said weakened portion, thereby exposing said breachable sealing membrane;

said body, neck, breachable sealing membrane and said cap being unitary and consisting entirely of one piece of homogeneous thermoplastic material.

3,977,554

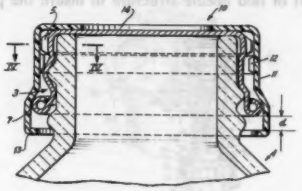
## CHILD-PROOF CLOSURE DEVICE FOR A CONTAINER HAVING A THREADED NECK PORTION

Allan Costa, Melville Park Road, Melville, N.Y. 11746

Filed Jan. 23, 1975, Ser. No. 543,346

Int. Cl.² B65D *55/02, 85/56;* A61J *1/00*

U.S. Cl. 215—220 7 Claims



1. A child-proof closure device for a container having a threaded neck portion, said device comprising in combination:

a screw-type closure cap and a cap-shaped drive member fitted upon said closure cap, the outer diameter of the screw cap side wall and the inner diameter of the drive cap side wall being so correlated that the drive cap is rotatable and axially displaceable relative to the screw cap;

said closure cap having on the outside of its side wall a circumferentially extended row of teeth axially extended and disposed adjacent to the base wall of said cap, and said drive cap having on the inside of its side wall a circumferentially disposed row of axially extended teeth, the diametrical spacing of said teeth being such that upon placement of the two rows of teeth in a side-by-side position the teeth in the two rows are in rotation transmitting engagement;

the side wall of the drive cap and the side wall of the screw cap having coacting stop means limiting said axial displacement of the drive cap relative to the closure cap between an inactive position in which the drive cap is lowered relative to the screw cap and an active limit position in which the drive cap is raised relative to the screw cap, the relative axial position of said rows of teeth on the side walls of the drive cap and the cover cap, respectively, being such that upon placement of the drive cap in the active limit position the teeth of the two rows are in side-by-side position and thus in rotation-transmitting engagement for simultaneous turning of both said caps and upon placement of the drive cap the two rows of the teeth are in an axially spaced position and thus out of rotation transmitting engagement.

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3,977,555

## PROTECTIVE SAFETY CAP FOR MEDICAMENT VIAL

Roger R. Larson, Champaign, Ill., assignor to Pharmaco, Inc., Champaign, Ill.

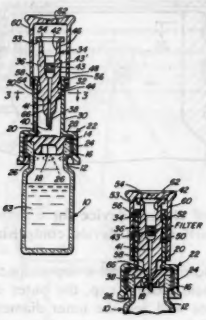
Continuation-in-part of Ser. No. 467,802, May 7, 1974, Pat. No. 3,940,003. This application June 16, 1975, Ser. No. 587,681

Int. Cl.² B65D *41/20, 51/22;* A61J *1/08*

U.S. Cl. 215—247 9 Claims

1. For use in connection with a container having a puncturable resilient seal, a closure cap for support from said container in position with a mounting portion of said cap disposed outwardly of said seal and opening inwardly into the interior of said cap against the outer side of said seal, a tubular needle structure constructed of shape retentive but somewhat flexive and resilient material, said needle structure being supported from said mounting portion with one end thereof opposing the outer side of said seal and for movement of said structure toward and away from said seal, said one end of said needle structure including a pointed end portion for projecting

through said seal, said pointed end portion tapering exteriorly toward the terminal end thereof, said pointed end portion, at a point spaced therealong from said terminal end, including a bulbous enlargement shiftable into the interior of said cap for engagement with and inwardly distending the area of said seal disposed about the portion thereof engaged by said pointed end portion and to thereby stretch said area upon final inward movement of said needle structure to insure the piercing of



said pointed end through said seal while at the same time limiting penetration of said pointed end through said seal, whereby after a manual inward thrust on said needle structure to pierce said seal is released the resiliency of said seal may outwardly displace said needle structure, upon return of said area of said seal to its static position, to a use position with said pointed end portion projecting only a predetermined amount through said seal.

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**3,977,556**

## METAL TEAR-OFF CAP

**Hermann Ritzenhoff, Marburg an der Lahn, Germany, assignor to Gebruder Seidel KG, Marburg an der Lahn, Germany**

**Continuation-in-part of Ser. No. 313,460, Dec. 8, 1972. This application June 17, 1975, Ser. No. 587,709**

**Claims priority, application Germany, Dec. 9, 1971, 2161026; July 9, 1974, 2432902**

**Int. Cl.[2] B65D *41/32***

**U.S. Cl. 215—256** **12 Claims**

1. An aluminum type sealing cap for crimping upon the neck of a container comprising a top, a substantially cylindrical skirt integrally joined to said top, at least one tear line of reduced strength disposed about said skirt for defining a tear-off strip relative to the remainder of said cap, a substantially concentrated aperture through said cap in said tear-off strip and extending across its width for initiating its separation from said remainder of said cap, the substantially concentrated aperture being of limited circumferential length whereby said cap is in itself capable of sealing the neck of the container to retain substantial internal pressure within the container, at least one smaller perforation in said tear-off strip which is narrower than said tear-off strip, a strong holding tab of separate material secured through said smaller perforation to said tear-off strip and inserted through said substantially concentrated aperture and disposed on both sides of said tear-off strip for grapsing and forceably initiating the separation and for separating said strip from said cap, said tab comprising a strong tear resistant plastic tape, said tape being joined together to itself and to said tear-off strip through said smaller perforation by an ultrasonic weld, said limited circumferential length of said aperture ranging from about 1.0 mm through about 3.0 mm., and the circumferential length of said perforation ranging from about 2.0 mm. through 3.0 mm.

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**3,977,557**

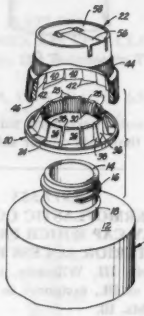
## CONTAINER-CLOSURE STRUCTURE EMPLOYING FITMENT TO PREVENT CLOSURE REMOVAL

**Robert E. Hazard, N. Kingstown, R.I., assignor to Polytop Corporation, Slatersville, R.I.**

**Filed Oct. 15, 1975, Ser. No. 622,724**

**Int. Cl.[2] B65D *45/32***

**U.S. Cl. 215—274** **5 Claims**



1. In the combination of a container having a generally cylindrical, externally threaded neck of a polymer material which will tend to deform when held under compression for a prolonged period and a closure having an internally threaded skirt, said closure being threaded on said neck, the improvement which comprises:

a plurality of closure ratchet means for permitting rotation in one direction and for preventing rotation in the opposite direction, said closure ratchet means being located on said skirt,

a ring formed of a material which is harder than and more resistant to deformation than said polymer material in said neck located around said neck adjacent to said skirt,

a plurality of ring ratchet means for permitting rotation in one direction and preventing rotation in the opposite direction, said ring ratchet means being located on said ring and being in contact with said closure ratchet means,

said closure and said ring ratchet means being oriented relative to one another and to the threads on said neck and on said skirt so as to permit said closure to be threaded down on said neck and so as to prevent said closure from being unthreaded from said neck when said ring is held against rotation, and

holding means for engaging said container so as to prevent rotation of said ring, said holding means being located on said ring, extending inwardly from said ring, and for engaging said container neck so as to deform said material in said neck into conformity with the configuration of said holding means in order to secure said ring against movement relative to said neck so that the action of said ratchet means will prevent said closure from being unthreaded from said neck,

coacting means on said closure and on said ring for distorting said ring so as to force said holding means on said ring inwardly into said engagement with said container neck as said closure is threaded on said neck,

said closure being located on said neck in a position in which said ratchet means are engaged with one another and in which said coacting means are in engagement with

one another so as to hold said holding means in said engagement with said container neck.

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**3,977,558**

## GOODS CONTAINER

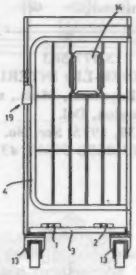
**Alvar Erling Nilsson, Falkenberg, Sweden, assignor to Pelly AB, Falkenberg, Sweden**

**Filed Sept. 19, 1975, Ser. No. 615,005**

**Claims priority, application Sweden, Sept. 30, 1974, 7412264**

**Int. Cl.² B65J *1/02*; B65D *45/16***

**U.S. Cl. 220—1.5** **2 Claims**



1. A goods container with at least one first side wall intended for opening and closing of said goods container and being mounted on or at a second side wall by hinge means provided both for pivoting said first side wall about the edge of said second side wall and for shifting said first side wall along the edge of said second side wall, said first side wall, in closing position of said goods container, extending between said second side wall and a third side wall, and a locking device being arranged between said first side wall and said third side wall, wherein said locking device comprises a locking hook in a recess in the edge of said third side wall and a locking clasp on the free edge of said first side wall, wherein the locking clasp is designed to grasp said locking hook and simultaneously permit movement of said locking hook and said third side wall which supports said locking hook, in a direction towards said first and said second side walls, to a first position in which said locking clasp is shiftable away from said locking hook so that said first side wall becomes pivotal to open position; and in a direction from said first and said second side walls, to a second position in which a portion of said locking clasp engages with a portion of said recess in the event of attempts to shift said locking clasp away from said locking hook.

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**3,977,559**

## LID FOR FOOD CONTAINER

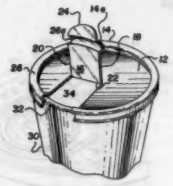
**Michael Lombardi, Piscataway, N.J., assignor to Jerome Kreeger, South Orange, N.J., a part interest**

**Filed Oct. 30, 1972, Ser. No. 301,978**

**Int. Cl.² A47G *19/22***

**U.S. Cl. 220—90.4** **3 Claims**

1. A reusable circular lid adapted to fit on and be fastened by hand over the rim of a container, said lid being of one piece construction and comprising a circular body portion which is substantially flat, said body portion including an annular groove or corrugation about the periphery thereof for fastening said lid to the rim of a container, a substantially flat pivot and a substantially flat flip-open section which extends away from a peripheral edge of the lid to said pivot, said pivot being defined by the juncture between said flip-open section and said body portion, said flip-open section being adapted to be repeatedly opened or closed to seal said container by pivoting said flip-open section about said pivot, said pivot being integral with said body portion and spaced from said peripheral edges of said body portion and stopping short of the geometric center of said circular lid, said flip-open section being capable of being supported at said pivot and by its own weight when in its open position, said flip-open section further being defined by the peripheral edge of said lid, said pivot and a pair of sides of said flip-open section linking said edge and said pivot, said pair of sides being spaced from the peripheral edges of said body portion and are defined by weakened areas to facilitate severing of said sides from said body portion.



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**3,977,560**

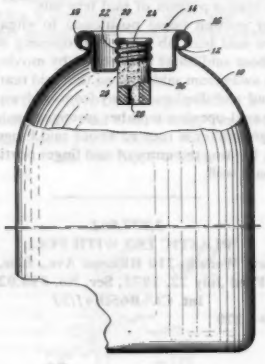
## PRESSURIZED FLUID CONTAINER WITH BUILT IN FILTER

**Joseph G. Stumpf, Fairfield, and Richard L. Testani, Monroe, both of Conn., assignors to Frigitronics of Conn., Inc., Shelton, Conn.**

**Continuation of Ser. No. 429,669, Dec. 28, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 568,896**

**Int. Cl.² B65D *42/02***

**U.S. Cl. 220—265** **4 Claims**



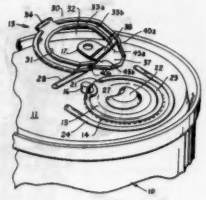
1. A container for fluid refrigerants which comprises: a substantially cylindrical can having an open mouth concentric therewith; a normally non-removable cap closing said mouth and defining a hollow thin wall, cylindrical nipple concentric with said mouth and cap, extending outwardly therefrom and including a needle-pierceable end wall, the cylindrical wall of said nipple being deformed to simultaneously define complementary external and internal threads thereon; and a cylindrical porous filter within said nipple in threaded engagement with said internal threads in the path of refrigerant discharged from said container through the pierced end wall.

**3,977,561**

## CAN END WITH NONDETACHABLE TEAR TAB AND OPENING RING

**Carl J. Strobe, 2831 Orchard Knob, Atlanta, Ga. 30339, and Robert A. Wells, 4450 Harris Trail NW., Atlanta, Ga. 30327**

**Filed Sept. 29, 1975, Ser. No. 617,931**
**Int. Cl.² B65D *41/32***
**U.S. Cl. 220—269** **10 Claims**



**1. A container wall having a nondetachable easy-open portion, comprising:**

**a wall;**

**a tear tab defined in said wall in part by a selectively separable predetermined line of weakness and in part by nonseparable hinge means which allows said tear tab to remain attached to said wall when separated along said line of weakness and displaced away from said wall and into a container partially defined by said wall, so that an opening is defined in said wall by the peripheral edge which remains when said tear tab is separated and displaced;**

**an opening member hingedly connected to said wall at a location on said wall separate from said tear tab;**

**said opening member having a handle portion which lies alongside said wall at a location spaced apart from said tear tab and which is on one side of said hinge connection of said opening member to said wall;**

**said opening member having a finger portion extending on the other side of said hinge connection and extending over at least a portion of said tear tab;**

**said finger portion being positioned to engage and exert force on said tear tab when said opening member is rotated about said hinge connection by moving said handle portion away from said wall, so that said tear tab becomes separated and displaced away from said wall; and**

**means on said opening member to engage said wall as said opening member is rotated about said hinge connection, thereby limiting the entry of said finger portion into opening in said wall.**

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**3,977,562**

## PLASTIC LID WITH PULL

**Theresa Marie Wedzik, 210 Hillcrest Ave., Erie, Pa. 16509**

**Filed July 22, 1975, Ser. No. 598,029**
**Int. Cl.² B65D *41/32***
**U.S. Cl. 220—270** **4 Claims**

**1. A lid for a cup or the like having a pie shaped wedge cut out piece terminating at a point adjacent the center of said lid and having two relatively straight diverging cut sides intersecting at said point,**

**a tab made of a relatively thin sheet of material coated on one side with pressure sensitive adhesive,**

**said tab being slightly larger than said pie shaped wedge cut out piece, the edges of said tab overlying said cut edge and extending beyond said cut edges of said pie shaped wedge cut out piece and adhered to said pie shaped piece and to said lid holding said pie shaped piece in place,**

**an end of said tab extending beyond the point of said wedge shaped piece and defining a finger engaging piece integrally attached to said tab,**

**said finger engaging piece being adapted to be grasped by an operator and pulled from said lid whereby said point of said pie shaped wedge cut out piece is lifted first and may be readily removed.**

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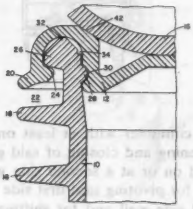
**3,977,563**

## CONTAINER-LID INTERLOCK

**William Gilbert Holt, Raynham, Mass., assignor to Hercules Incorporated, Wilmington, Del.**

**Filed June 30, 1975, Ser. No. 591,679**
**Int. Cl.² B65D *39/00, 43/06***
**U.S. Cl. 220—306** **4 Claims**



**1. A resealable plastic container-lid interlock comprising:**

**a generally cylindrical container having a closed bottom and an open top, said container having a radially outwardly extending locking rib at the top of said container and at least one radially outwardly extending reinforcing rib spaced from the top of said container, said container having an inwardly radially projecting shear resistant lip spaced along the inside of the cylindrical surface below the open top of said container and below said radially outwardly extending locking rib;**

**a lid for attachment to said container, said lid being substantially a flat disc having a peripheral channel near the edge of said disc; said channel being normal to the plane of said disc, the outer portion of said channel being provided with an inwardly projecting locking portion and an outwardly projecting prying flange, both being substantially in the plane of said disc, said locking portion being complementary with the locking rib of said container and substantially all of the perimeter of said prying flange being no greater in diameter than that of the reinforcing rib of said container so that the prying flange is sheltered from accidental dislodgement, the top of said channel having an angled seating portion directly over the inner portion of said channel to facilitate centering alignment of stacked containers and to distribute a bearing load, the inner portion of said channel having an annular detent in the straight cylindrical wall of said inner portion, said detent being complementary with said shear resistant lip of said container, the cylindrical surface of said container above said shear resistant lip cooperating with the straight cylindrical wall of said inner portion and said angled seating portion to convert stacking and lid impact forces into shear force on said shear resistant lip, said locking portion and said detent providing a double interlock of said lid with respect to said container and providing uniform downward pull on the inner and outer sides of said container to seal said lid with respect to said container.**

3,977,564

## SEALING SLIDE FOR CONTAINERS

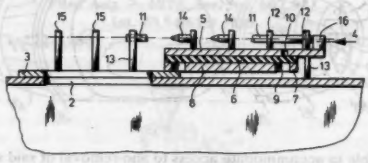
Oskar Braun, Wilhelmstrasse 41, 614 Bensheim, Bergstrasse, Germany

Filed Oct. 6, 1975, Ser. No. 619,707

Claims priority, application Germany, Oct. 18, 1974, 2449561

Int. Cl.² B65D *43/20*

U.S. Cl. 220—346 6 Claims



1. A sealing slide at containers, such as liquid settling tanks, pressing tanks, high pressure tanks and the like, for example, for the processing and treatment of fruits and juices of all kinds, wherein a sealable aperture is provided in the container jacket on which a sliding lid can slide while sealing the aperture, characterized by and including a cover with an outer cover panel (5) and an inner ring (7) exposing the aperture (2), a rubber diaphragm (6) sealingly clamped between the cover panel (5) and the ring (7), an air connection (10) from the outside in the area of the exposed membrane (6), and guides (11,13) for sliding the cover (5,6,7).

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3,977,565

## DISPENSER PACKAGE

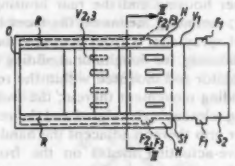
Hermann Muller, Munich, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Nov. 25, 1974, Ser. No. 527,162

Claims priority, application Germany, Nov. 30, 1973, 2359853

Int. Cl.² B65D *73/02*, *83/08*; B65H *1/04*, *9/14*

U.S. Cl. 221—63 6 Claims



1. A dispenser package, comprising a container having an end wall; a stack of objects in said container and each having a predetermined width, said objects being assemblies that are each composed of an adhesive film splice and at least one protective cover layer on said film splice; an opening in said end wall of a width corresponding to said predetermined width, so as to permit withdrawal of said objects from said container; an abutment on said container in the region of said opening; and an abutment portion on each object and adapted to engage said abutment and to flex out of the way when requisite withdrawing force is exerted upon the object.

3,977,566

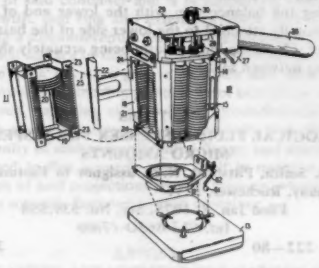
## SEMICONDUCTOR WAFER HANDLING APPARATUS

Donald Franklin Hill, Allentown, and Juris Strautins, Kintnersville, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 31, 1975, Ser. No. 627,620

Int. Cl.² B65G *33/06*

U.S. Cl. 221—222 8 Claims



1. Wafer handling apparatus for transferring semiconductor wafers from spaced-apart stack form in a cassette to single wafers positioned on a horizontal work surface and the reverse process from single wafer to stack form in a cassette comprising,

a wafer feed machine including feed screw means for moving wafers in the axial direction of said means,

said machine including means for receiving a plurality of wafers in said feed screw means simultaneously,

said wafer feed machine further having means for dispensing and receiving a single wafer at an end of said feed screw means,

and wafer collecting means comprising a wafer collecting adapter cooperative with said wafer feed machine,

said wafer collecting adapter including means for retrieving and feeding a semiconductor wafer into an end of said feed screw means of said wafer feed machine.

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3,977,567

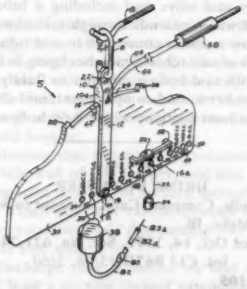
## INTRAVENOUS ALARM DEVICE

George H. Rudd, 1602 Post Oak, Irving, Tex. 75061

Filed Mar. 14, 1975, Ser. No. 558,230

Int. Cl.² G01F *15/00*

U.S. Cl. 222—39 8 Claims



1. An alarm device to alert that a predetermined amount of liquid has been dispensed from a liquid dispensing container comprising: a balance arm; a support member; pivot means pivotally securing the balance arm to the support member; a counterweight, means to movably secure the counterweight to

the balance arm on one side of the pivot means; means to secure a liquid dispensing container to the balance arm on the other side of the pivot means, said counterweight being selectively positionable to initiate pivotal movement of said balance arm upon dispensing a predetermined amount of liquid from a liquid dispensing container secured to the balance arm; alarm means actuated by pivotal movement of the balance arm in response to dispensing of a predetermined amount of liquid from the container; and legs on the support member embracing the balance arm with the lower end of said legs being pivotally attached to the lower side of the balance arm, the upper side of the balance arm being arcuately shaped and extending between said legs.

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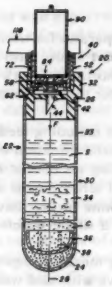
**3,977,568**

## BIOLOGICAL FLUID DISPENSER FOR DISPENSING MICRO AMOUNTS

**David S. Smith, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 8, 1975, Ser. No. 539,558**
**Int. Cl.² B65D *17/00***
**U.S. Cl. 222—80** **28 Claims**



1. Apparatus for dispensing biological fluid in micro amounts, comprising a container for the fluid and means joined to the container for dispensing the fluid; the container comprising a walled member defining a compartment, and a closure member at one end of the container;
said means comprising
1. at least one valve disposed adjacent said one end of said compartment,
2. a dispensing chamber and
3. passage means for fluidly connecting the chamber to the compartment, said passage means being selectively blocked by said valve and including a tubular member one end of which extends through said closure member, and a hollow member connected to said tubular member, the interior of said tubular member being in fluid communication with said hollow member to fluidly connect the hollow member to said compartment, said chamber being disposed at least partially within said hollow member.

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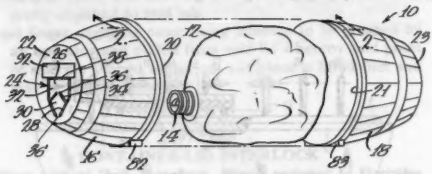
**3,977,569**

## DRINK DISPENSER

**William R. Scholle, Compton, Calif., assignor to Scholle Corporation, Northlake, Ill.**

**Filed Oct. 14, 1975, Ser. No. 621,746**
**Int. Cl.² B67D *35/56, 5/60***
**U.S. Cl. 222—105** **1 Claim**

1. A barrel-shaped drink dispenser comprising an outer shell formed by a pair of cup-shaped halves, each half having one closed and one open end, said halves being connectable to and separable from one another at their open ends about a plane perpendicular to the longitudinal axis of the dispenser, cooperable locking means on said halves adjacent their open ends for locking said halves together at said open ends to form a closed outer shell in the shape of a barrel, an inner flexible bag filled with fluent material and having a dispensing spout thereon, said inner flexible bag being contained within said outer shell with said spout adjacent the closed end of one said halves, said one half having an opening in its closed end adjacent said spout and including integrally formed pivotal flaps located in and normally closing said opening, said flaps being



movable to accommodate access to and removal of said spout through said opening and to secure said spout in said opening in dispensing position at said one end of said shell, and a transverse leg element on each of said halves for preventing said barrel-shaped shell from rolling, each leg element having a portion adjacent the open end of the respective half adapted to be grasped to aid in separating said halves after the fluent contents of said inner bag have been dispensed.

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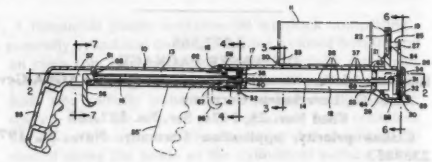
**3,977,570**

## SPRAYING APPARATUS

**Thomas J. Smrt, 31W 300 W. Bartlett Road, Bartlett, Ill. 60103**

**Filed June 20, 1975, Ser. No. 588,813**
**Int. Cl.² B67D *5/64***
**U.S. Cl. 222—174** **3 Claims**



1. A spraying apparatus for spraying the contents of a valve-equipped aerosol spray can comprising elongated front and rear housings, one of the housings being telescopingly received by the other housing and the rear housing having a hand grip thereon, mounting means on the front housing for holding an aerosol spray can, a front actuator rod mounted within the front housing for longitudinal sliding movement therein, a rear actuator rod mounted within the rear housing for longitudinal sliding movement therein, the front and rear actuator rods being telescopingly related and the rear actuator rod having a finger grip thereon adjacent the hand grip of the rear housing, valve-actuating means on the front housing connected to the front actuator rod for opening the valve of the aerosol can when the front actuator rod moves longitudinally, a latch housing on one of the actuator rods and a latch positioned within the latch housing for movement in a direction transverse to the direction of said longitudinal movement, spring means for resiliently biasing the latch into a latching position, and an actuating button for the latch extending from the latch housing through a slot in one of the housings for moving the latch out of the latching position, the other actuator rod including a plurality of longitudinally spaced detents engageable with the latch when the latch is in the latching position whereby longitudinal movement of one of the actuator rods causes longitudinal movement of the other actuator rod, the actuator rods and the front and rear housings being telescopable when the latch is not in its latching position

whereby the length of the spraying apparatus can be varied, and friction means positioned between the housings for frictionally preventing telescoping movement of the housings when the latch is in the latching position and the actuator rods are moved to open the valve but permitting telescoping movement of the housings when the latch is released.

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**3,977,571**

**LIQUID APPLYING MEANS**

**Thomas Gaskins, Palmdale, Fla. 33944**

**Filed Aug. 7, 1975, Ser. No. 602,921**

**Int. Cl.² B67D *5/06***

**U.S. Cl. 222—180** **11 Claims**

1. Treating means for applying treatment liquid to wood work members such as posts or the like having areas desired to be treated, said treating means comprising container means for receiving and storing a quantity of treatment liquid, support means for said container means comprising a nail-like member having a pointed end which can be driven into the member to be treated for supporting said container means above the areas desired to be treated, and dispensing means for dispensing treatment liquid from said container means at a varying rate which is greatest when said container is full and which progressively decreases as the amount of treatment liquid in the container means decreases wherein said container comprises a hollow generally conical shaped vessel having an apex defining its lowermost extent and top closure means at its upper extent and wherein said nail-like member extends through an opening in the apex of said vessel and also extends through a centrally positioned opening in said top closure means.

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**3,977,572**

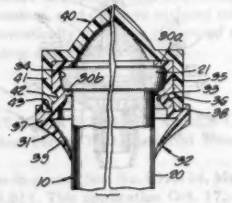
**AEROSOL SAFETY CAP SECURED BY A GROOVED RING**

**Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.**

**Filed Sept. 23, 1974, Ser. No. 508,377**

**Int. Cl.² B65D *83/14, 41/18***

**U.S. Cl. 222—182** **2 Claims**



1. An aerosol package comprising:

a cylindrical aerosol container having a circumferential bead on its upper end;

a plastic cap extending above the upper end of said container and having a generally cylindrical base portion; said base portion having on its lower extremity both downwardly extending and radially inwardly extending projections;

and a plastic ring extending around the upper end portion of said container, said ring being formed from at least two circumferential segments having joining means formed thereon, said ring on its internal surface having an annular supporting recess which receives said circumferential bead of said container and is in supporting engagement therewith, said ring also extending below said bead and having a circumferential outwardly extending flange, the external surface of said ring and the upper surface of said flange each having a groove in which said downwardly and inwardly extending projections of said plastic cap are received, said ring also having a circumferential apron which projects downwardly and inwardly from the outer extremity of said circumferential flange, said apron being adapted to flex inwardly upon itself in order to permit receipt of said projections by said grooves, whereby said cap is securely fastened to said container.

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**3,977,573**

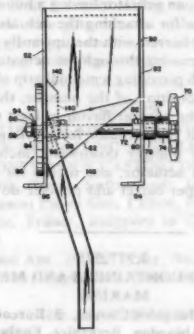
**SEED PLANTER ATTACHMENT FOR GARDEN PLOW**

**Stephen N. Coleman, Dothan, Ala., assignor to Coleman Garden Plow Manufacturing Co., Inc., Dothan, Ala.**

**Filed Nov. 19, 1974, Ser. No. 525,227**

**Int. Cl.² G01F *11/24;* A01C *7/00***

**U.S. Cl. 222—368** **9 Claims**



1. A seed planter attachment for a plow comprising:

a. a seed hopper mounted on the frame of said plow, said hopper including walls which define a seed holding compartment, said walls including spaced side walls one of which is formed with first and second spaced openings therethrough, said first opening communicating with the seed in said hopper;

b. a seed planting disc mounted for rotation exteriorly of said one side wall of said hopper, said disc being formed with at least one seed cup in the face thereof adjacent said side wall which does not extend through said disc, said cup during rotation of said disc passing over said openings in said one side wall;

c. a seed discharge tube mounted on said side wall and having at least a portion thereof extending through said compartment, said tube communicating at its upper end with said second opening, and

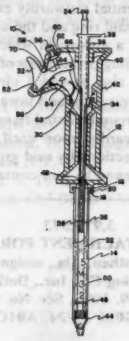
d. means for rotating said disc whereby seeds are picked up by said seed cup from said hopper through said first opening and deposited through said second opening to said discharge tube for gravity discharge therethrough.

3,977,574

## DISPENSING PIPETTE ACTUATOR SYSTEM

Bradley Scott Thomas, 2316 Harcroft Road, Timonium, Md. 21093

Filed May 29, 1975, Ser. No. 581,885
Int. Cl.² B67D 5/42
U.S. Cl. 222—391 11 Claims



1. A pipet assembly comprising: a pipet barrel, a unitary plunger in the pipet barrel and having a portion extending upwardly therefrom, an actuator having a housing with a bore therethrough, means for attaching the actuator to the upper portion of the pipet barrel, with the upwardly extending portion of the plunger passing through the actuator housing bore and being of a length providing a manual grip above the actuator housing at any position of the plunger; the upwardly extending portion of the plunger having at least one rack therealong, and means in the actuator for pawling said rack and thereby forcing the plunger downward, including a trigger protrusive from the actuator, and means for simultaneously disposing of said pipet barrel and plunger downwardly from said actuator.

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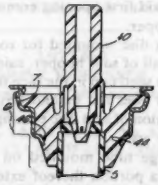
3,977,575

## PRESSURIZED CONTAINERS AND METHOD OF MAKING

Richard Terence Macquire-Cooper, 3 Burcot Park, Clifton Hampden, near Abingdon, Berkshire, England

Filed Aug. 27, 1973, Ser. No. 392,052
Claims priority, application United Kingdom, Aug. 25, 1972, 39623/72
Int. Cl.² B65D 83/00
U.S. Cl. 222—396 12 Claims



1. A method for making a pressurized package comprising the following steps:

supporting a unitary valve member;

supporting a container adjacent the valve member, a neck portion of the container having a preformed surface dimensioned for an interference fit with a mating surface of the valve member;

moving the valve member into engagement with the container neck until:

a. an interference fit is created between annularly continuous rib and groove formations in the preformed surface of the neck and in the mating valve member surface;

b. the inward end portion of the valve member projects into the container and bulges beyond the neck for sealing securement therein; and

c. an internal valve seat is disposed downstream of the inward end of the neck thus forcing, in response to radially outward fluid pressure within the container, the surface of the valve member against the mating surface of the neck, which enhances the interference fit;

terminating the movement toward interference fit when the depth of the engagement is such that the ratio of the smallest cross sectional dimension of the neck portion, in interference with the valve member body, to the depth of the neck portion in interference, is no greater than 5:1.

6. In a pressurized package including a container having an aperture defined by a neck, in which is sealed a valve including a unitary member, defining a valve inlet and a valve outlet, and having a tubular body portion of resilient material containing a valve inlet passage and an integral actuating portion containing a valve outlet passage, the inlet and outlet of the valve being joined by a controllable flow path extending wholly within the unitary member and incorporating an annular valve seat spaced from the inlet of the valve, the package incorporating improvements comprising:

mating means preformed in the neck for affecting a circumferentially continuous, interference fit seal between the neck and the mating valve body portion;

the body portion projecting and bulging from the neck into the container for securing the body portion in sealing relation to the neck;

the ratio of the smallest cross sectional interference fit dimension of the neck to the interference fit depth of the neck being no greater than 5:1; and

the annular valve seat located downstream of the inward end of the neck so that fluid pressure within the container acts radially outwardly within the inlet passage of the valve, in its closed position, to force the valve body portion against the neck.

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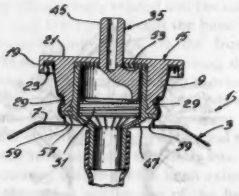
3,977,576

## SPRAY CAN AND VALVE CONSTRUCTION

Arnaldo Amabili, 2101 Champlain Apt. 416, Montreal, Quebec, Canada

Filed Feb. 24, 1975, Ser. No. 552,421
Int. Cl.² B65D 83/14
U.S. Cl. 222—402.1 3 Claims



3. An aerosol container having a main body, an opening in the main body at one end thereof, a neck portion projecting out from the one end of the body, a rim located at the free edge of the neck portion, a mounting member insertable into the neck portion and seating on the rim, said mounting member being provided with a flange extending outwardly and

having an undercut groove for receiving the rim, and with a resilient member mounted in the undercut groove for bearing on the rim, a valve mechanism insertable into the mounting member, means on the neck portion comprising a surface spaced from the rim, extending about the neck portion and projecting inwardly in a depression extending about the mounting member and a second surface located below the first surface, extending about the neck portion and projecting inwardly under the mounting member, said second surface bearing against a portion of the valve mechanism, to hold the mounting member in sealing relation on the rim, and means comprising a shoulder extending about the valve mechanism and sitting in a groove extending about the mounting member to lock the valve mechanism in a sealing position in the mounting member.

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**3,977,577**

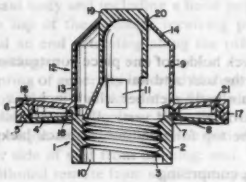
## SELF-CLOSING CLOSURE

**Billy Nilsson, Mjolby, Sweden, assignor to KeNova AB, Malmo, Sweden**

**Continuation of Ser. No. 387,160, Aug. 9, 1973, abandoned. This application July 23, 1975, Ser. No. 598,199**

**Int. Cl.² B65D 5/72**

**U.S. Cl. 222—499** **10 Claims**



1. A closure adapted for use with a container, the closure automatically opening in response to pressure upon the contents of the container, and being self-closing upon the release of pressure, said closure comprising first and second members mutually connected at their peripheries, said first member having a first flexible, resilient surface and a projection extending therefrom, said second member having a second flexible, resilient surface with a dispensing opening, said projection of said first member extending toward said opening in said second member and closing said opening when said closure is in the closed position, each of said flexible, resilient surfaces having in the closed position of said closure a convex shape which faces toward the convex shape of the other surface, each of said surfaces having in the open position of said closure a concave shape which faces toward the concave shape of the other surface, said convex surfaces changing to concave surfaces upon the application of opening pressure to the contents of the container to withdraw said projection of said first member in relation to said opening of said second member to open the closure and permit the dispensing of the contents from the container, said concave surfaces returning to convex surfaces automatically upon the release of opening pressure, thereby to close said closure.

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**3,977,578**

## CONTAINER WITH ATTACHED CLOSURE

**Walter Merton Perry, 76 Locust Hill Road, Darien, Conn. 06820**

**Continuation-in-part of Ser. No. 231,124, March 2, 1972, Pat. No. 3,843,011. This application Oct. 17, 1974, Ser. No. 515,444**

**Int. Cl.² B65D 47/10**

**U.S. Cl. 222—541** **17 Claims**

1. An easy open container having a top wall, and having a body which is attached to said top wall along its periphery and defining a rim, and with easy opening slide gate closure means in said container top wall, said easy opening means comprising,

a. an opening in said container top wall, and with two opposite sides of said opening each having slide gate grooved guide means thereon,

b. said slide gate grooved guide means extending along at least part of the length of each of said opposite sides of said opening, and with the grooving in said grooved guide means on one side being substantially parallel to the grooving in said grooved guide means on the opposite side of said opening,

c. a slide gate positioned in said grooved guide means and bridging said opening, and being larger than said opening.

d. a pull tab means connected to said slide gate for manual pulling of said slide gate to open said container closure,

e. frangible membrane sealing means positioned on the underside of said container top wall, and extending over said opening and beyond and around the periphery of said opening, and being adhesively secured to top wall material all around and outward of said opening, and making said container top closure airtight,

f. engagement means between said slide gate and said frangible membrane, said engagement means causing a relatively small part only of said frangible membrane to move with said slide gate when said slide gate is drawn over to open said closure means, and thereby to assist in rupturing said frangible membrane to form an opening, and

e. means to limit the axial sliding movement of said slide gate so said slide gate remains at least partially engaged in said grooved guide means, and remains attached to said container top wall after opening.

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**3,977,579**

## APPARATUS FOR ADJUSTING THE OPERATING POSITION OF CASTING VESSELS DURING THE CONTINUOUS CASTING OF STEEL

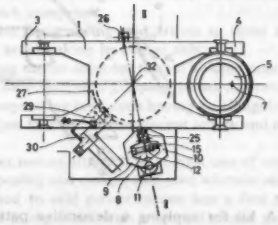
**Heinrich Marti, Forch, Switzerland; Jacques Barbé, Saint Etienne, France; Pierre Gay, l'Etrat, France, and Raymond Vial, Lorette, France, assignors to Concast AG, Zurich, Switzerland**

**Filed Apr. 28, 1975, Ser. No. 572,268**

**Claims priority, application Switzerland, May 10, 1974, 6394/74**

**Int. Cl.² B22D 41/00**

**U.S. Cl. 222—591** **5 Claims**



1. An apparatus for adjusting the operating position of a casting ladle cooperating with a tundish during the continuous casting of metals, especially steel, comprising a pivotal transport mechanism pivotal about a vertical axis for the transport of the casting ladle from a preparatory position into an initial operating position for the casting of the metal, drive means for pivoting said transport mechanism, a locking device for posi-

tionally fixing the initial operating position of the casting vessel, said locking device being provided with means for adjusting the casting ladle into different effective operating teeming positions within a desired location above the tundish.

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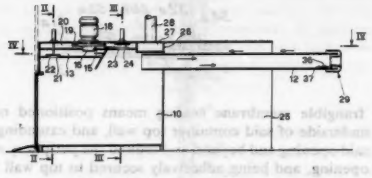
**3,977,580**

## APPARATUS FOR TURNING A TUBULAR FABRIC INSIDE OUT

**Gino Dalla Vecchia, Santorso (Vicenza), Italy, assignor to Giuseppe Sperotto S.p.A., Zene' (Vicenza), Italy**

**Filed Dec. 16, 1975, Ser. No. 641,160**
**Claims priority, application Italy, Dec. 19, 1974, 30766/74**
**Int. Cl.² A41H *43/00***
**U.S. Cl. 223—43** **4 Claims**



1. A pneumatic machine for turning tubular fabrics inside out, characterized by comprising, in combination: at least a collecting container for the fabric as turned inside out, at least a fabric-turning tube overhangingly extending from said container and directly communicating therewith, an exhausting and blowing unit for alternately drawing and blowing air through said tube, baffling means at the free end of said tube and capable of deflecting a blown air stream in a direction opposite to that of blowing onto the outer surface of the tube, and valve means adapted automatically to open and close the free tube end respectively when air is drawn and blow therethrough.

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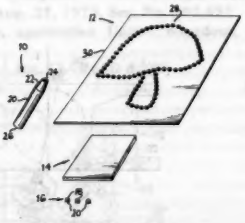
**3,977,581**

## METHOD AND APPARATUS FOR APPLYING GARMENT DECORATION

**John Franzson, Parsippany, N.J., assignor to Precision Assembly Corporation, West Orange, N.J.**

**Filed May 28, 1975, Ser. No. 581,642**
**Int. Cl.² A41H *43/00***
**U.S. Cl. 223—44** **10 Claims**



1. A kit for applying a decorative pattern to a garment comprising:

a. a tool having a cylindrical shaft portion with a tapered forward portion, the front end of said forward portion containing a concave recess;

b. at least one stud having a head portion and prongs extending therefrom, said concave recess being of a size to fit over said extended prongs and capable of bending them inwardly upon application of a force;

c. a pattern formed by a plurality of dots on a surface material, and

d. a base member having a flat support surface capable of being easily penetrated by said prongs.

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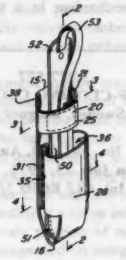
**3,977,582**

## BLACK JACK HOLDER

**Robert J. McMahon, 1105 Brennan Drive, Warminster, Pa. 18974**

**Filed Mar. 24, 1975, Ser. No. 561,471**
**Int. Cl.² A45C *11/00***
**U.S. Cl. 224—1 R** **6 Claims**



1. A black jack holder of one piece construction to be worn on the belt of the user and having

a unitary main body member which includes

a lower horizontally and vertically flexible tubular housing open at the top for retention of black jacks of different shapes,

said housing comprising

a rear downwardly extending panel portion formed integrally with a front panel portion extending upwardly from the bottom thereof,

said front panel portion having an upper part with a larger horizontal dimension than the lower parts of said front and rear panel portions,

said upper part of said front panel portion connected to the upper part of said rear panel portion contiguous to the edges of said panel portions by spaced vertical lines of stitches terminating above the lower margin of said upwardly extending portion,

the lower part of said rear panel portion and the lower part of said front panel portion being open at each side to allow for a change of shape of the housing to accommodate various sizes of black jack,

said integral lower parts of said panel portions limiting downward movement of the black jack,

said main body member having a pair of flaps in overlapping relation above said tubular housing,

detachably engageable securing means on said flaps for releasably securing the overlapped flaps around a handle portion of the black jack for retaining the same in the housing, and

said main body member having means for mounting said main body member on the belt of the user.

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**3,977,583**

## FRONT OPENING HOLSTER

**John E. Bianchi, and Richard D. E. Nichols, both of Fallbrook, Calif., assignors to Bianchi Leather Products, Inc., Temecula, Calif.**

**Filed July 29, 1974, Ser. No. 492,757**
**Int. Cl.² F41C *33/02***
**U.S. Cl. 224—2 B** **12 Claims**

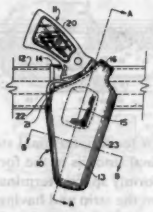
1. A front opening holster comprising:

a body of leather or leather like material including a pair of sides defining a revolver handgun receiving cavity and

including internal recesses for receiving opposite sides of the cylinder portion of a revolver handgun, an upper opening through which the grip of a handgun, an upper opening through which the grip of a handgun protrudes and a front opening through which the frame and barrel of the handgun may be removed by forward movement of the handgun;

spring means within said body for maintaining said front opening normally closed in the absence of drawing pressure of the handgun as exerted by the wearer;

said spring means comprising:



a first spring of generally inverted U shape secured to one side of said body and including a bend portion extending over the top of the cylinder receiving portions of said body and an end extending along the other side of said front opening;

a second spring of generally inverted U shape secured to the second of said pair of sides of said body and including a bend portion extending over the top of the cylinder receiving portion of said body and an end extending along the other side of said front opening; and

means positioned remote from said front opening for securing said springs together with said ends in substantially parallel relation.

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**3,977,584**

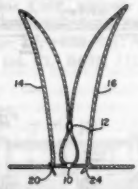
## BODY HARNESS FOR THE PROTECTIVE RETENTION OF AN EXTENSION CORD

**John F. Pecoraro, 406 Gregory Road, Paramus, N.J. 07652**

**Continuation-in-part of Ser. No. 458,487, April 5, 1974, abandoned. This application June 9, 1975, Ser. No. 585,446**

**Int. Cl.² A45C *1/04***

**U.S. Cl. 224—5 H** **7 Claims**



1. A body harness which is easily placed and secured to the body of a user and in mounted condition is positioned over the arms and upper body portion of said user to provide a guide and retaining means for an extension cord and the like, said harness including: (a) a pair of substantially like sized loops of stretchable material, these loops attached to each other at one portion, this attached portion disposed to be placed at the mid-back of the user on which it is to be in mounted condition; (b) a snap securing member which is a substantially U-shaped wire form having a wider space between the wires of the legs of the U-shaped form opposite the opening of the U-shaped form slidably secured to one of the loops, said member selectively closable by a complementary means and when closed with provisions to retain a selected portion of the extension cord in said wider space, and (c) complementary snap securing means which is a disc-like member having a wire retaining groove adapted to receive and retain the wire form, said means provided on and by the other loop, the snap securing member and this complementary means connectable when the lower portion of the loops are drawn toward each other to form a belt-like encirclement of the user's waist and when the snap securing member in cooperation with the complementary means is closed, means for retaining a forward portion of the extension cord is provided and at this same time the mounted harness has one loop brought over one shoulder with the belt-like portion of this loop passing under the arm, and also the other loop is brought over the other shoulder and the belt-like portion of said other loop is brought under the arm, this tightened and positioned harness being drawn tightly to the body of the user with the overlaid body harness at the user's back retaining a forward portion of the cord between the harness and the user's body with the cord then passing over the shoulder and to the retaining means provided with the snap securing member.

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**3,977,585**

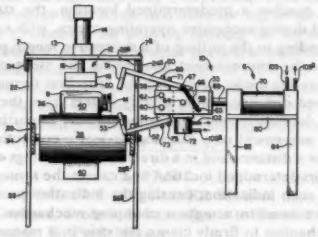
## DEMOILING APPARATUS

**Peter A. Sagorski, Kansas City, Mo., assignor to Ethyl Development Corporation, Kansas City, Mo.**

**Filed Mar. 14, 1975, Ser. No. 558,464**

**Int. Cl.² B26F *3/00***

**U.S. Cl. 225—101** **10 Claims**



1. An apparatus for removing a moil from a hollow, blown, plastic article which comprises:

a. holding means for grasping said article to resist movement of said article along its center axis;

b. a moil gripping means adjacent to said holding means for gripping said moil, said moil gripping means comprising,

i. a pair of cooperating jaws each having an elongated jaw arm and a jaw face attached adjacent to one end of said arm and

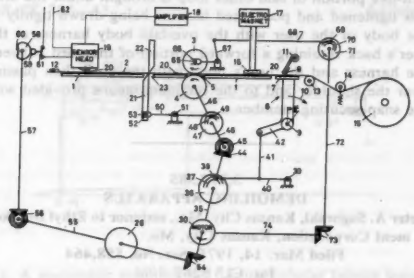
ii. a jaw power means attached to at least one of said jaw arms for opening and closing said jaws wherein said jaw arm attached to said power means has a first sector gear which intermeshes with a second sector gear attached to said other jaw arm whereby power applied by said jaw power means to said jaw arm attached thereto is transmitted to said other jaw arm causing said jaws to open and close; and

c. power means connected to said moil gripping means for moving said moil gripping means along a path substantially parallel to said center axis and away from said article.

## 3,977,586
## SEVERING OF SECTIONS OF A PRINTED PACKAGING STRIP

Wolfgang Hertrich, Neuhausen am Rheinfall, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Aug. 5, 1975, Ser. No. 601,075
Claims priority, application Switzerland, Aug. 6, 1974, 10741/74
Int. Cl.² B65H 17/44
U.S. Cl. 226—2 7 Claims



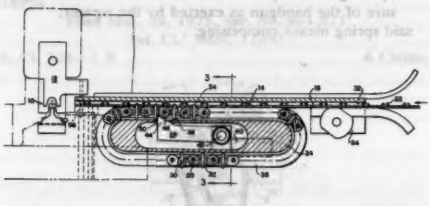
1. In a method for precisely advancing a printed packaging strip provided with markings at uniformly spaced distances and which is to be cut into length portions corresponding to such distances, a sensor head being provided along the path of advance of the strip to produce an indication each time a marking reaches a predetermined location, the strip being advanced during successive operating cycles, with each cycle corresponding to the cutting of a successive length portion of the strip, the improvement comprising the steps of, during each operating cycle: advancing the strip first through a predetermined distance which reliably differs from the distance between successive markings; subsequently imparting to the strip, by movement of a carrying device, a correcting movement over a distance and in a direction which brings a marking to such predetermined location and causes the sensor head to produce such indication; causing the indication produced by the sensor head to actuate a clamping mechanism to cause that mechanism to firmly clamp the strip in a manner to prevent further advance of the strip; and continuing the movement of the carrying device until it reaches a predetermined point of movement direction reversal.

2. Apparatus for precisely advancing a printed packaging strip provided with markings at uniformly spaced distances and which is to be cut into length portions corresponding to such distances, said apparatus comprising: means for advancing the strip through a predetermined distance which reliably differs from the distance between successive markings; sensing means disposed along the path of advance of the strip for producing an indication each time a marking reaches a predetermined location; clamping means actuatable for applying to the strip a clamping force which holds the strip stationary, said clamping means being connected to said sensing means to be actuated by the indication produced by said sensing means; and carrying means arranged to move over a predetermined path, from an initial position, in the direction required to bring a marking to such predetermined location and to return to its starting position after reaching the end of such path, said carrying means applying to the strip a force sufficient to carry the strip along therewith in the absence of actuation of said clamping means and insufficient to impart any movement to the strip when said clamping means is applying such clamping force to the strip, and said carrying means being driven to continue moving to the end of its path after actuation of said clamping means.

## 3,977,587
## CONVEYOR FEED MECHANISM

Joseph W. Baldyga, Mount Clemens, and Thomas M. Cairns, Birmingham, both of Mich., assignors to Diamond Die & Mold Co., Mount Clemens, Mich.

Filed Mar. 28, 1975, Ser. No. 563,073
Int. Cl.² B65H 17/38
U.S. Cl. 226—74 5 Claims

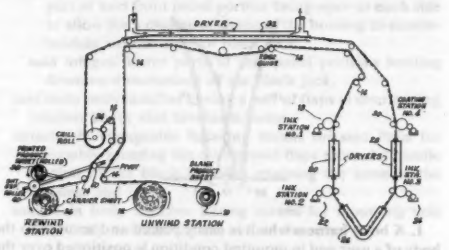


1. Feed apparatus for feeding terminal stock to an applicator, in which the terminal stock is in the form of a continuous metal strip having uniformly spaced terminal forming portions extending laterally from the strip and having uniformly spaced openings coordinated with the spacing between terminal forming portions, stock feed means comprising an endless conveyor in the form of a chain made up of a succession of pivotally interconnected links, said chain having a straight portion adapted to extend along the continuous strip, pins extending through and projecting beyond both sides of the links and rigidly fixed to said links and forming a first series of rigid projections at one side of said chain spaced thereon and dimensioned to enter the openings in the strip and a second series of rigid projections at the opposite side of said chain, and feed means engageable with the projections of said second series for advancing said chain step-by-step in increments equal to the spacing between the openings in the strip and between successive terminal forming portions.

## 3,977,588
## APPARATUS FOR HANDLING FLEXIBLE WEBS

Charles B. Meade, Arlington Heights; Guy L. Pikul, Chicago, and Thomas J. Carberry, Wheaton, all of Ill., assignors to Vision Wrap Industries, Inc., Palatine, Ill.

Filed Feb. 24, 1975, Ser. No. 552,593
Int. Cl.² B65H 17/24
U.S. Cl. 226—168 15 Claims



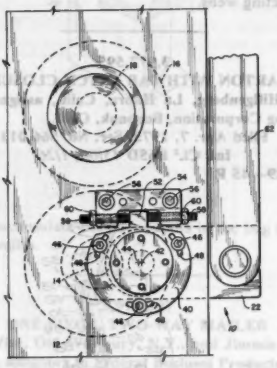

1. An apparatus for transporting a continuous stretchable web of polyvinyl chloride to be printed comprising a substantially non-stretchable carrier web having a polyvinyl chloride surface for contact with said stretchable web, drive means for moving said carrier web, means for delivering said stretchable web to said carrier web for locating said stretchable web in face-to-face contact with said carrier web whereby said webs are transported in overlying relationship, a web separator for contact with the overlying webs to separate the webs, said separator including spreader means for imparting a laterally directed spreading force to said stretchable web, and means for collecting the separated stretchable web.

3,977,589

## IDLER ROLLER ASSEMBLY FOR PUNCH PRESS FEED

P. J. Gentile, Pittsburgh, Pa., assignor to Vamco Machine and Tool, Inc., Pittsburgh, Pa.

Filed Apr. 14, 1975, Ser. No. 567,690
Int. Cl.² B65H 17/22
U.S. Cl. 226—180 8 Claims



1. An idler roller assembly for a punch press feed having a driving roller and a cooperating idler roller wherein said idler roller is selectively movable away from said driven roller, said idler roller assembly comprising:

a. an idler roller;

b. a frame rotatably receiving said idler roller;

c. co-axial trunion means pivotally supporting said frame within the housing of said punch press feed;

d. eccentric adjustment means interposed between said trunion means and said housing whereby minute adjustments may be made to the angular relationship between said idler roller and said housing;

said frame being pivotable about said trunion means axis to selectively move said idler roller away from said driven roller.

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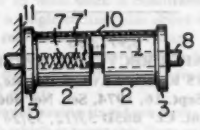
3,977,590

## COOLED ROLLER

Elliot C. Linker, Irvine, Calif., assignor to Electronic Engineering Company of California, Santa Ana, Calif.

Filed Mar. 19, 1975, Ser. No. 560,003
Int. Cl.² B65H 17/20
U.S. Cl. 226—190 10 Claims



1. A rotatable roller assembly for operation in a gaseous environment, comprising;

a. a body (1), having a cylindrical surface (2),

b. a central axial cylindrical aperture (6) within said body,

c. a shaft (8) journaled within said aperture, and

d. a continuous helical groove (7) in said body in the surface of said aperture and extending the full length of said aperture,

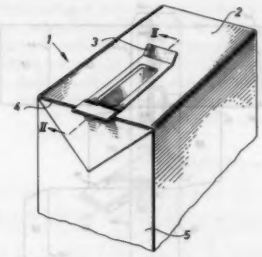
whereby ambient gas may traverse said groove when said roller is rotated about said shaft (8).

3,977,591

## COVER STRIP FOR THE POURING OPENING IN A PACKING CONTAINER

Kjell Mårtensson, Malmo, and Stig Löthman, Sodra Sandby, both of Sweden, assignors to AB Ziristor, Lund, Sweden

Filed June 16, 1975, Ser. No. 586,858
Claims priority, application Sweden, June 28, 1974, 7408566; Apr. 25, 1975, 7504804
Int. Cl.² B65D 39/04
U.S. Cl. 229—7 R 7 Claims



1. In a packing container having a pouring opening in the top thereof, the improvement comprising a cover strip for the pouring opening, said cover strip comprising an inner portion releasably secured over the pouring opening, an intermediate portion extending outwardly from the pouring opening and an outer portion folded under said intermediate portion and extending substantially back to the pouring opening, at least part of the outer portion being secured to the top of the packing container, said intermediate portion being provided with a transverse tearing indication, whereby when the inner portion of the cover strip is released from the top of the packing container to uncover the pouring opening for access to the contents thereof, at least said inner portion is separated at the tearing indication from the remainder of the cover strip including the outer folded portion which remains secured to the top of the packing container and provides a sanitary path for the contents when poured from the packing container.

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3,977,592

## DIE CUT CONTAINER BLANK

Jack C. Gorham, Keokuk, Iowa, assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Aug. 25, 1975, Ser. No. 607,243
Int. Cl.² B65D 5/48
U.S. Cl. 229—28 R 2 Claims

1. A blank of foldable sheet material for a square container having a four-cell divider therein, comprising:

three rectangular side wall panels connected in side-by-side relationship along vertical fold lines;

a fourth side wall panel made of two separate panel sections located at opposite ends of said three side wall panels, said panel sections formed in size to be an overlapping manufacturer's joint;

a center partition panel hingedly connected to one lateral edge of said blank along one of said panel sections;

at least one removable section hingedly attached along a horizontal weakened line of separation to said center partition panel; and

said center partition panel and said removable section each having slots formed partially therethrough.

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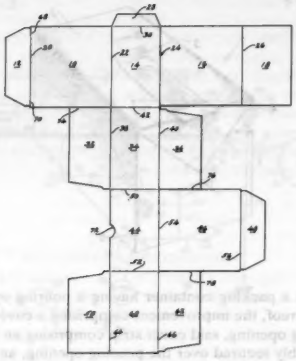
**3,977,593**

## CARTON WITH DOUBLE, WALL AND BOTTOM

**Lee Rotman, Cleveland, Ohio, assignor to The A. L. Garber Co., Cleveland, Ohio**

**Filed Oct. 14, 1975, Ser. No. 621,957**
**Int. Cl.² B65D *5/08***
**U.S. Cl. 229—38** **3 Claims**



1. A carton produced from a blank, said carton having Left and Right spaced upright side walls and rear and front spaced upright walls, said walls forming an upright enclosure, each of said upright side walls having upper and lower dust flaps integral therewith and directed mutually inwardly of said enclosure and defining planes substantially normal to said walls, an inner bottom panel integral with the lower edge of said rear upright wall and extending forwardly above said lower dust flaps and toward said front wall to terminate in an inner front wall directed upwardly adjacent to the inner face of said front wall, an outer bottom panel integral with the lower edge of said front upright wall and extending rearwardly below said lower dust flaps and terminating in a tuck portion, said tuck portion inserted forwardly intermediate said inner bottom panel and said lower dust flaps.

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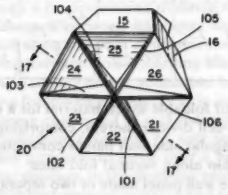
**3,977,594**

## POLYGONAL CARTON

**Walter B. Swan, 8713 S. 87th Terrace, Justice, Ill. 60458**

**Filed Aug. 4, 1975, Ser. No. 601,593**
**Int. Cl.² B65D *5/10, 5/36***
**U.S. Cl. 229—39 R** **20 Claims**



1. A polygonal carton having a plurality of side panels and a strong weight supporting bottom formed by a plurality of generally triangular bottom panels equal in number to said side panels and a plurality of interconnecting webs, each web extending between a pair of adjacent bottom panels, each said bottom panel being hingedly connected to one of said side panels, being inclined upwardly from the bottom edge of the side panel to which it is connected so as to form an acute angle therewith, having two side edges which abut adjacent side edges of adjacent bottom panels and having said webs on either side thereof hingedly connecting said bottom panel to an adjacent bottom panel, whereby a load which is placed on said bottom and which urges said bottom panels downwardly will be supported by the locking and bearing engagement between said abutting edges of said bottom panels and by said interconnecting webs.

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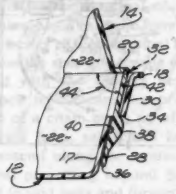
**3,977,595**

## CARTON WITH TAB LATCH CLOSURE

**David E. Hillgenberg, La Habra, Calif., assignor to Dolco Packaging Corporation, Burbank, Calif.**

**Filed Apr. 7, 1975, Ser. No. 566,011**
**Int. Cl.² B65D *45/00, 1/26***
**U.S. Cl. 229—45 R** **10 Claims**



1. A carton, comprising:

a first space-defining member formed with walls terminating in a first closing edge;

a second space-defining member formed with walls terminating in a second closing edge for engagement with said first closing edge to define a chamber between said members bounded by said walls;

a portion of said second member wall extending outwardly, forming a closed loop having a leading edge adjacent said second closing edge and having a trailing edge, said leading edge being wider than said trailing edge; and

a tab hingedly connected to said first closing edge and extending therefrom for insertion through said loop, said tab being narrower along its length than the leading edge of said loop, thereby providing a passageway along at least one side thereof, through said loop thereat into said carton;

said loop and tab being formed to secure said tab against said second member when received through said loop.

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**3,977,596**

## NEWSPAPER RECYCLING APPARATUS

**Bruce Gamble, 815 Rosedale Ave., Lafayette, Calif. 94549**

**Filed Sept. 16, 1974, Ser. No. 506,090**
**Int. Cl.² B65D *33/12, 33/24***
**U.S. Cl. 229—54 R** **6 Claims**

1. Apparatus for bailing newspapers so that they can easily be transported for recycling, said apparatus comprising a paper bag having a normally open end with a handle on each side of the bag at said open end and an interior volume adapted to receive a stack of newspapers defined by at least two opposed sides terminating at the open end, said bag having a paper flap having one end attached to one said side of the bag adjacent the open end and an opposite free end, at least one tab at the free end of the flap and at least one slit formed in the other side of the bag, said flap adapted to extend over the exposed ends of the newspapers at the open end of

the bag and fold inwardly along the interior surface of said other side of the bag for insertion of the tab outwardly through

the slit to encapsulate the newspapers in the bag for carrying with the handles.

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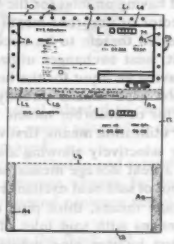
3,977,597

## ONE PIECE, TWO-WAY MAILER

Lester V. Wise, Old Westbury, N.Y., and Jimmie Neill, Hatboro, Pa., assignors to Federal Business Products, Inc., New York, N.Y.

Filed Oct. 7, 1975, Ser. No. 620,323
Int. Cl.² B65D 27/06
U.S. Cl. 229—73 9 Claims



1. A one-piece, two-way mailer assembly making it possible for a company to send a charge statement to a customer and for the customer to mail back a remittance; said assembly being formed by a single rectangular sheet of paper having a front face and a rear face and comprising:

A. an upper panel, an up-center panel, a down-center panel and a lower panel defined by transverse lines of perforations on said sheet;

B. said upper panel having its side margins indented to form a record stub which is severable from said upper panel by a line of perforations, said upper panel being folded over said up-center panel to form a forwarding section in which said up-center panel carries said statement on its front face;

C. said lower panel being folded over the down-center panel to form a return section, the side margins of the foldedover lower panel being bonded to said down-center panel to define an envelope for receiving said record stub and said remittance;

D. said forwarding section being folded over said return section and being temporarily marginally bonded thereto to complete said assembly.

3,977,598

## CENTRIFUGE TUBE

Bernard McDonald, 7700 Seville Ave., Huntington Park, Calif. 90255

Division of Ser. No. 363,383, May 24, 1973, Pat. No. 3,894,845, and a continuation-in-part of Ser. No. 375,012, June 29, 1973, Pat. No. 3,937,213. This application Apr. 17, 1975, Ser. No. 569,059
Int. Cl.² B04B 9/12
U.S. Cl. 233—26 1 Claim

1. A centrifuge tube comprising:

an elongated tube open at its upper end and closed at its bottom end;

an external re-entrant groove along a portion of the tube;

an internal tube having an open end in the bottom end of the elongated tube; and

a flexible external tube in fluid communication with the internal tube and removably fittable in the re-entrant groove.

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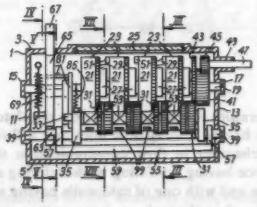
3,977,599

## COUNTING DEVICES

Hans Bud, London, and Peter Alway, Bushey, both of England, assignors to Hans Bud, London, England

Filed May 16, 1975, Ser. No. 578,341
Claims priority, application United Kingdom, May 22, 1974, 22946/74
Int. Cl.² G06C 15/42
U.S. Cl. 235—144 HC 16 Claims



1. A counting device comprising a counter having coaxial rotatable number wheels, a reset cam provided with each number wheel to rotate therewith, transfer pinions, a shaft on which the transfer pinions are rotatably mounted and which is displaceable relatively to the number wheels, the pinions being disposed respectively intermediate successive number wheels, each pinion meshing with gear teeth on one of the number wheels adjacent thereto and adapted to engage drive means on the other number wheel during rotation of said other number wheel thereby partially to rotate said one of the number wheels, reset fingers together rotatable about a common axis to engage respectively with the reset cams to reset the number wheels, the reset fingers and the transfer pinions being located, prior to resetting, respectively out of engagement with the reset cams and in engagement with the gear

teeth on the number wheels, and a reciprocably movable actuating member adapted to effect resetting of the number wheels during movement thereof in one sense by rotation of the reset fingers and upon movement in the reverse sense to be repositioned for subsequent resetting action, characterised in that a cam element is rotatable relatively to the number wheel axis during an initial part of the resetting movement of the actuating member to effect displacement of the transfer pinion shaft to disengage the pinions from the gear teeth on the number wheels, and abutment means are fixed relatively to the reset fingers and adapted, during a subsequent part of the resetting movement of the actuating member, to reverse the rotation of the cam element so that after resetting of the number wheels and whilst the reset fingers are engaged with the reset cams return movement of the pinion shaft with consequent re-engagement of the transfer pinions with the gear teeth on the number wheels is effected.

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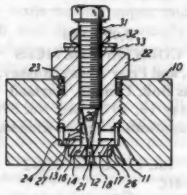
**3,977,600**

## TEMPERATURE RESPONSIVE FLUID FLOW REGULATOR

**Charles Elmer Sheets, Jr., Racine, Wis., assignor to J. I. Case Company, Racine, Wis.**

**Filed Nov. 6, 1975, Ser. No. 629,481**
**Int. Cl.² G05D *23/02***
**U.S. Cl. 236—93 R** **6 Claims**



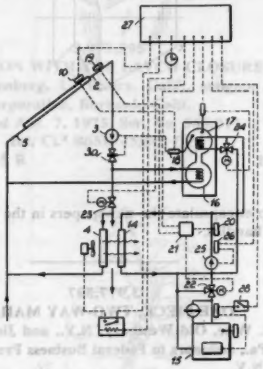
**1.** A temperature responsive fluid flow regulator comprising a body piece having a fluid flow inlet and a fluid flow outlet and a fluid chamber in flow communication therebetween, said body piece having confining walls defining a pocket with one open side and with one of said walls having said fluid flow outlet passing therethrough, a temperature responsive expandable and contractable elastomeric member disposed in said pocket and tightly confined by said walls and having an orifice extending therethrough in fluid flow communication with said fluid flow outlet and said fluid chamber for interrupting flow between the latter two, and a restraining member extending across said pocket open face and disposed in contact with said elastomeric member and being fluid tight therewith and releasably secured in said body piece for urging said elastomeric member fluid tightly against said walls and with said restraining member having a fluid passageway in fluid flow communication with said orifice and said chamber, and with said restraining member and said elastomeric member disposed and adapted to have said elastomeric member confined in said pocket to expand to reduce the size of said orifice in response to an increase in the temperature of the fluid and thereby regulate the quantity of fluid flowing through said regulator, according to the temperature of the fluid.

**3,977,601**

## SYSTEM FOR RECOVERING SOLAR ENERGY AND ITS DIRECT UTILIZATION

**Vittorio Bearzi, Azzano X, Italy, assignor to Sunlife S.p.A., Italy**

**Filed Apr. 14, 1975, Ser. No. 568,088**
**Int. Cl.² F24J *3/02*; F24D *3/00***
**U.S. Cl. 237—1 A** **2 Claims**



**1.** A heating system utilizing alternatively solar and fuel energy comprising a first heating fluid circuit exploiting solar energy and a second heating fluid circuit exploiting fuel energy, said first circuit including collector or absorber means for radiant solar energy adapted to heat said heating fluid of said first circuit and having an inlet for the heating fluid to be heated in said collector or absorber means and an outlet for the heating fluid heated therein to be circulated in said first heating fluid circuit, heat exchanger utilization means, said utilization means having an input for the heating fluid and an output therefor, first pipe means directly connecting said outlet of the collector or absorber means with said input of said heat exchanger utilization means, first valve means in said first pipe means for selectively allowing and preventing fluid flow therethrough, a heat storage means, second pipe means connecting the output of said heat exchanger utilisation means with said heat storage means, third pipe means connecting said heat storage means with said inlet of said collector or absorber means, first by-pass pipe means having one end thereof hydraulically connected with said second pipe means at a point situated between said heat exchanger means and said heat storage means, said first by-pass pipe means having another end thereof hydraulically connected with said third pipe means at a point situated between said heat storage means and said inlet of said collector or absorber means, second valve means at said one end of said first by-pass pipe means for selectively allowing and preventing fluid passage through said first by-pass pipe means towards said collector or absorber means and through said second pipe means towards said heat storage means, and second by-pass pipe means having one extremity thereof connected with said heat storage means and having another extremity thereof connected with said first pipe means in a point situated between said first valve means and the input of said heat exchanger means, first pump means in said first pipe means for creating a stream of said heating fluid directed from said collector or absorber means towards said heat exchanger means and therefrom towards said heat storage means and therefrom towards said inlet of said collector or absorber means and alternatively from said heat exchanger means towards said first by-pass pipe means and therefrom towards said inlet of said collector or absorber means via said third pipe means, and first temperature responsive control means for controlling said pump means and the setting of said first and second valve means, said second heat-

ing fluid circuit exploiting fuel energy being hydraulically separated from said first heating fluid circuit and having a fuel heated boiler, and own heat exchanger utilisation means, and pump and valve means for circulating the heating fluid, and second temperature responsive control means controlling the operation of the own valve and pump means of said second heating fluid circuit, said second temperature responsive control means having at least one temperature sensitive element responsive to the temperature of the heating fluid of said first heating fluid circuit in at least one point thereof, to put in operation said second heating fluid circuit when the heating fluid of said first heating fluid circuit is below a prestablished value.

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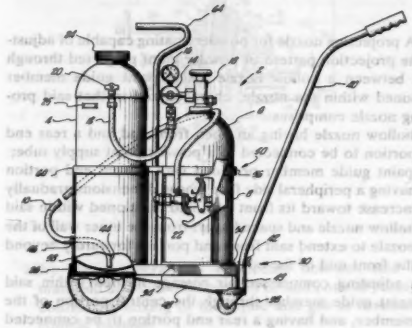
**3,977,602**

## MOBILE SPRAY APPARATUS

**Paul W. Kirch, 2325 Kellog Court, Altadena, Calif. 91001**

**Filed Oct. 29, 1974, Ser. No. 518,369**
**Int. Cl.² B05B 7/24**
**U.S. Cl. 239—74** **7 Claims**



1. A mobile pressure spray apparatus comprising:
a first pressure vessel adapted to contain a motive source;
a second pressure vessel adapted to contain a fluid such as paint to be sprayed;
conduit means connected to and extending between the first and second pressure vessels for supplying the motive source to the second pressure vessel for pressurizing the fluid;
means for spraying the fluid; and
means for transporting the first and second pressure vessels as an operative mobile unit including a wheeled support cart and a removable tray member adapted to retain the first and second pressure vessel thereon and to permit their unitary removal from the support cart as a combined operative unit, the tray member further including a base plate and a plurality of ring retainer members attached to the base plate and spaced respectively apart, the ring members being aligned to receive and laterally retain the first and second pressure vessels, at least one ring retainer being split to provide an opening therein to permit the passage of the means for spraying the fluid.

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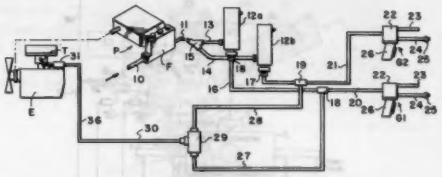
**3,977,603**

## FLUID DELIVERY SYSTEM

**Hubert E. Magee, Jr., Houston, Tex., assignor to Partek Corporation of Houston, Houston, Tex.**

**Filed Oct. 22, 1975, Ser. No. 624,913**
**Int. Cl.² F16K 21/00; B05B 15/00, 9/00**
**U.S. Cl. 239—76** **12 Claims**

1. A system for supplying a high pressure stream of fluid comprising:
a pump having a low pressure inlet adapted to be connected to a source of fluid and a high pressure outlet;
a prime mover drivingly connected to said pump and including a throttle for controlling the speed of operation of said pump;
throttle control means connected to said throttle and adapted to respond to a control signal to move said throttle to vary the speed of said prime mover between a relatively fast speed and a relatively slow speed;
at least two dump guns each including a fluid inlet, a relatively high pressure fluid outlet, a relatively low pressure



fluid outlet, and actuating means for diverting flow between the fluid outlets of said guns;
flow control means connected between the inlet of each gun and the outlet of said pump for maintaining a substantially constant load on said pump during random actuation of said actuating means; and
means connected between said flow control means and said throttle control means for providing said control signal in response to actuation of at least one of said guns.

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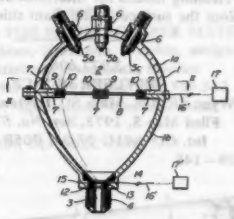
**3,977,604**

## FUEL INJECTION NOZZLE ASSEMBLY

**Taro Yokoyama, 2-20, 5-chome, Tokowadaira, Matsudo, Chiba, and Osamu Akibayashi, 14-7, 2-chome, Moto-Ookubo, Narashino, Chiba, both of Japan**

**Filed June 25, 1975, Ser. No. 590,026**
**Claims priority, application Japan, July 3, 1974, 49-76069**
**Int. Cl.² B05B 17/06**
**U.S. Cl. 239—102** **8 Claims**

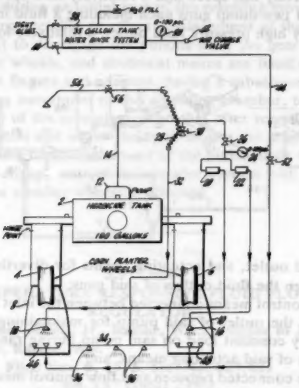


1. A fuel injection nozzle assembly comprising in combination:
a. a housing with an inner wall of symmetrical curvilinear cross-sectional configuration around a longitudinal central axis, a mid-section defined in said housing, one end of said housing being tapered from about said mid-section towards said one end (1*b*);
b. retaining means (7, 7') coupled to said inner wall at said mid-section and a central ultrasonic vibrating disc (8, 8') retained by said retaining means, said disc having a diameter less than that of said housing leaving a gap (11) between said inner wall and said disc outer periphery;
c. a main ultrasonic nozzle (3') including a ring vibrator (13, 13') at said tapered end (1*b*) including a threaded outwardly projecting coupling side for coupling to a fuel combustion zone; and,
d. at least first and second auxiliary jet nozzles at said housing other end (1*a*) generally projecting angularly towards the intersection of said disc (8, 8') and said central axis.

## 3,977,605
## VEHICULAR HERBICIDE SPRAYER

Robert T. Sheldon, P.O. Box 486, DeLeon Springs, Fla. 32028

Filed Oct. 20, 1975, Ser. No. 624,042
Int. Cl.² B05B 15/02, 15/04, 1/28
U.S. Cl. 239—104 11 Claims

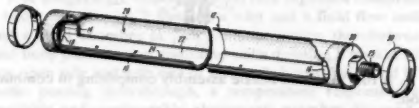



1. A vehicular herbicide sprayer, which comprises:
a. a vehicular support frame,
b. a herbicide reservoir mounted on the support frame,
c. a means for measuring the flow rate of herbicide from the reservoir,
d. a spray means operatively connected to the herbicide reservoir and adapted to apply herbicide to unwanted vegetation,
e. a vertically disposable shield enclosing said spray means for protecting desirable plants from an overspray of herbicide, and
f. spray cleaning means for intermittently removing herbicide from the surface of the plant shield.

## 3,977,606
## DIFFUSER DEVICE

Robert J. Wyss, 5858 N. Main St., Dayton, Ohio 45405

Filed May 5, 1975, Ser. No. 574,326
Int. Cl.² A01G 27/00; B05B 1/30
U.S. Cl. 239—145 9 Claims



1. A diffuser device comprising a frame including end portions longitudinally spaced apart by and interconnected to the respective extremities of rigidifying strip means which function therewith to determine the configuration of said frame, an elastomeric material peripherally encompassing said frame and defining therewith an interior diffuser chamber, said material being provided, throughout the extent thereof, with a multitude of extremely fine punctures producing therein microscopic ruptures so minute as to be self-sealing and generally imperceptible in the absence of an interior pressure in said chamber sufficient to stretch the elastomeric material about microscopic ruptures, and means defining an inlet to said diffuser device for directing fluid under pressure to the interior of said chamber to be diffused through microscopic ruptures in said material stretched under the influence of the pressure thereof, whereby to provide that said fluid under pressure will issue from said diffuser device in the form of fine needle-like jets.

## 3,977,607
## PROJECTING NOZZLE FOR POWDER COATING

Kunio Kobayashi, Kamakura; Eiji Saito, Sagamihara; Satoshi Shiki, and Hiroshi Hayashi, both of Tokyo, all of Japan, assignors to Ransburg Corporation, Indianapolis, Ind.

Filed Sept. 24, 1975, Ser. No. 616,449
Claims priority, application Japan, Oct. 16, 1974, 49-118907
Int. Cl.² B05B 5/04, 1/34
U.S. Cl. 239—145 10 Claims

1. A projecting nozzle for powder coating capable of adjusting the projection pattern of powder paint projected through a slit between a hollow nozzle and a paint guide member positioned within the nozzle, characterized in that said projecting nozzle comprises:
A hollow nozzle having an open front end and a rear end portion to be connected to a powder paint supply tube;
A paint guide member provided with a front end portion having a peripheral side face whose dimensions gradually increase toward its front end, and positioned within said hollow nozzle and spaced apart from the inner wall of the nozzle to extend said front end portion forwardly beyond the front end of the nozzle;
An adjusting compressed air passage formed within said paint guide member through the central portion of the member, and having a rear end portion to be connected to an adjusting compressed air supply tube;
A cavity formed within the front end portion of said paint guide member, and having a front end opening in the front end face of the member and a rear end portion communicating with said adjusting compressed air passage;
A pattern adjusting member provided with a front end portion having a peripheral side surface of about the same configuration as that of said cavity, and positioned within said cavity to form, between the peripheral side surface of its front end portion and the inner wall of the front end portion of the cavity, an adjusting compressed air discharge slit of increasing size communicating with said adjusting compressed air passage; and
An air chamber formed in the front end portion of said pattern adjusting member to open its front end over most of the area of the front end face of the pattern adjusting member and communicating with said adjusting compressed air passage, and an air venting member partially closing the front end opening of said air chamber.

## 3,977,608
## ATOMIZING SYSTEM AND ATOMIZING NOZZLE ASSEMBLY

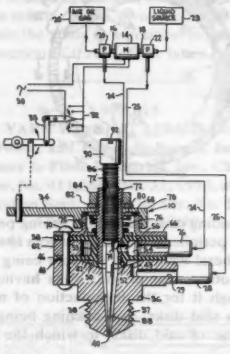
Alan R. Bullock, 29 Division St., Bangor, Maine 04401

Filed July 24, 1975, Ser. No. 598,812
Int. Cl.² B05B 7/12
U.S. Cl. 239—410 12 Claims

1. An atomizing nozzle comprising:
a body portion including a conical bore including an outlet orifice of reduced cross-section, and an inner inlet portion;
means for introducing pressurized gas to said inlet portion for carrying a liquid through the conical bore so that the

liquid will be increased in velocity as it approaches the outlet orifice and is atomized as it exits from the outlet orifice and expands thereat;

a liquid introducing manifold surrounding said inlet portion for containing liquid to be carried by the gas passing through the conical bore; and



valve means operatively connected between said liquid manifold and said inlet portion of said conical passage for controlling mixing of the liquid and gas as it enters said conical passage.

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**3,977,609**

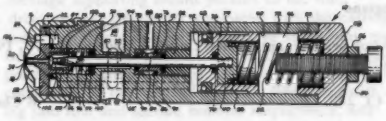
**ATOMIZER**

Donald A. Gallant, Charlotte, N.C., assignor to Longwood Machine Works, Incorporated, Woodside, N.Y.

Division of Ser. No. 432,746, Jan. 11, 1974, Pat. No. 3,910,496. This application July 14, 1975, Ser. No. 595,849

Int. Cl.² B05B 7/12

U.S. Cl. 239—417.3 5 Claims



1. An atomizer comprising a body portion having a liquid discharge nozzle at the front end thereof and a liquid flow chamber connected to said nozzle, means for supplying liquid to said liquid flow chamber and for controlling the liquid flow thereto, means for discharging air under pressure from said body portion at said nozzle to aspirate and atomize liquid from said nozzle, sealing means selectively operable for allowing and stopping liquid flow through said nozzle, said sealing means including a stationary sealing component at the inner end of said nozzle, and retaining means extending between said stationary sealing component and the end of said liquid flow chamber opposite said inner end of said nozzle to retain said stationary sealing component in operative position.

**3,977,610**

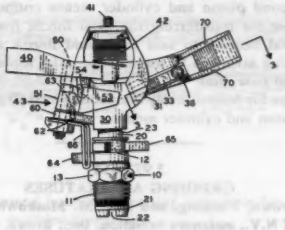
**OSCILLATING SPRINKLER**

John A. Royer, Fresno, Calif., assignor to James R. Coson, Fresno, Calif.

Filed Dec. 22, 1975, Ser. No. 643,193

Int. Cl.² B05B 3/04

U.S. Cl. 239—230 6 Claims



1. In a sprinkler having a nozzle adapted to direct a stream along an axis in predetermined relation thereto, a pair of cooperative concave vanes; and means mounting the vanes in fixed spaced relation for integral movement to and from the stream with their concavities disposed toward a predetermined fluid path therebetween, one of the vanes being adjacent to the nozzle and having an inner end disposed theretoward in acute angular relation to the axis when in the stream and an opposite end curved laterally from the axis, the other vane in its entirety being spaced laterally and longitudinally of the axis from said one vane in the direction of curvature thereof so that the vanes overlap neither laterally nor longitudinally of the axis, and said other vane having an inner end substantially parallel to said opposite end of said one vane and an opposite end substantially parallel to the inner end of said one vane.

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**3,977,611**

**APPARATUS FOR REFINING FIBER MATERIAL**

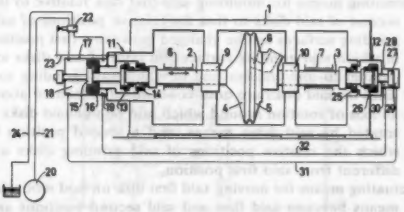
Axel Henning Sjöbom, Njurunda, Sweden, assignor to SCA Development Aktiebolag, Sundsvall, Sweden

Filed Mar. 20, 1975, Ser. No. 560,542

Claims priority, application Sweden, Mar. 27, 1974, 7404131

Int. Cl.² B02C 7/06, 7/14

U.S. Cl. 241—251 8 Claims



1. Apparatus for refining fibrous material comprising

a first shaft for supporting a first refining disc,

a second shaft for supporting a second refining disc,

a base mounting said first and second shafts and said refining discs for rotation in opposite directions,

said first and second refining discs being in juxtaposed position to define a refining zone therebetween,

at least one of said shafts being axially displaceable,

bearing means for said shafts adapted to receive the axial forces developed during refining,

said bearing means including at least a first and second axial bearing for said first shaft,

first piston and cylinder means connected to said base for transferring the axial forces from said first axial bearing to said base,

said bearing means further including at least a third and fourth axial bearing for said second shaft,

a second piston and cylinder means connected to said base for transferring the axial forces from said third axial bearing to said base, said fourth axial bearing being arranged to transfer the axial forces directly to said base, and

means for hydraulically connecting said first and second piston and cylinder means.

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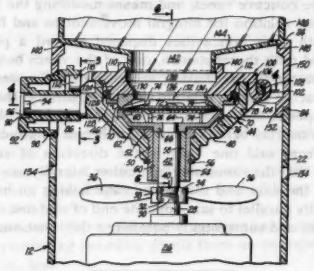
## 3,977,612
## GRINDING APPARATUSES

**Lester Brown, Flushing, and Paul M. Moskowitz, Brooklyn, both of N.Y., assignors to Salton, Inc., Bronx, N.Y.**

**Filed June 9, 1975, Ser. No. 585,379**
**Int. Cl.² B02C 7/10, 7/14**
**U.S. Cl. 241—254** **18 Claims**



1. A grinding apparatus which includes two generally circular grinding disks, each of said disks having a peripheral grinding surface and a center region, said disks being located so that said grinding surfaces are adjacent to one another, said center regions being shaped so as to define an internal space generally between said grinding disks, inlet means extending through a first of said disks for introducing material to be ground into said space and drive means for rotating at least one of said disks relative to the other of said disks in which the improvement comprises:

mounting means for mounting said first disk relative to the second of said disks so that the relative positions of said grinding surfaces can be changed between a first position in which said grinding surfaces on both of said disks are parallel to one another and in which said grinding surfaces on said disks are both concentrically located about an axis of rotation around which said one of said disks is rotated by said drive means, and a second position in which the relative positions of said grinding disks are different from said first position,

actuating means for moving said first disk on said mounting means between said first and said second positions and for holding said disks in said positions, said actuating means being operatively connected to said first disk, and

hopper means for containing material to be ground and for conveying such material into said space located so as to be in communication with said inlet means, said hopper means fitting with respect to said first disk so as to accommodate said first disk being moved between said first and said second positions without such material passing other than from said hopper means into said space.

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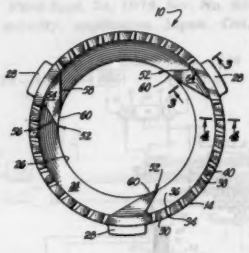
## 3,977,613
## GRINDING DISKS

**Paul M. Moskowitz, Brooklyn, N.Y., assignor to Salton, Inc., Bronx, N.Y.**

**Filed June 9, 1975, Ser. No. 585,378**
**Int. Cl.² B02C 7/08, 7/12**
**U.S. Cl. 241—261.3** **8 Claims**



1. A set of grinding disks, said disks having peripheral walls and ring-shaped peripheral grinding surfaces spaced internally from said peripheral walls, said surfaces being located adjacent to one another, one of said disks having an opening extending through it for the introduction of material to be ground between said disks, said opening being centrally located in said one of said disks, in which the improvement comprises:

the interiors of said disks within said grinding surfaces being recessed so as to be spaced from one another,

said surfaces being flat surfaces having a plurality of spaced grooves located therein, said grooves leading across said grinding surfaces from the interiors thereof to the exteriors thereof, said grooves having an unsymmetrical V-shape, each of said grooves having a substantially vertical, radially extending wall on the side thereof toward which material will move during relative rotation between said desks, and

projection means extending toward the interiors of said disks from the interiors of said grinding surfaces for conveying material from between said grinding disks toward said grooves and said surfaces and for comminuting such material as it is conveyed.

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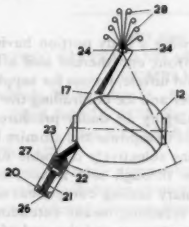
## 3,977,614
## WINDING APPARATUS

**John Gordon Hardwick, Kidderminster, England, assignor to Imperial Metal Industries (Kynoch) Limited, Birmingham, England**

**Filed Mar. 1, 1974, Ser. No. 447,345**
**Claims priority, application United Kingdom, Mar. 7, 1973, 11152/73**
**Int. Cl.² B65H 54/64, 57/04, 81/08**
**U.S. Cl. 242—2** **8 Claims**



1. A filament winding apparatus comprising:

a mandrel mounting for receiving a mandrel on which an article is to be wound and for rotating a received mandrel about an axis thereof; an arm; a pivot mounting for the arm; a filament guide carried on the arm for pivotal movement relative to the arm about an axis extending longitudinally thereof; a member arranged to be driven in rotation about an axis; a first drive transmission connecting said member to said arm to cause the arm to pivot on its pivot mounting and thereby to cause the filament guide to move generally longitudinally of a mandrel on said mandrel mounting; and a further drive transmission connecting the member and the filament guide to pivot the guide relative to the arm with a predetermined phase difference relative to the pivot motion of the arm such as to maintain the guide in a position in advance of the arm in the direction of travel of the latter.

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**3,977,615**

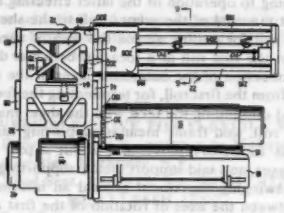
**YARN WINDING APPARATUS**

**Malcolm P. Owens, and Edgar E. Barnes, both of Charlotte, N.C., assignors to Fiber Industries, Inc., Charlotte, N.C.**

**Division of Ser. No. 411,560, Oct. 31, 1973, abandoned. This application Sept. 17, 1974, Ser. No. 506,704**

**Int. Cl.² B65H** *67/00*

**U.S. Cl. 242—41** **4 Claims**



1. In an apparatus for winding yarn onto first and second bobbins carried on a bobbin supporting roll to form first and second yarn packages, the improvement comprising an improved doffing mechanism for at least partially removing the yarn packages from the roll, said doffing mechanism comprising

a. package contacting arm positioned transversely of the roll;

b. a carriage supporting the arm.

c. carriage supporting means parallel to the roll;

d. drive means operatively associated with the carriage to move the carriage along the carriage supporting means, between an initial position and first and second doffing positions, wherein said first and second doffing positions correspond to the carriage positions associated with doffing said first and second bobbins respectively; and

e. first control means for sequentially stopping the carriage at first and second doffing positions and returning the carriage to the initial position, said first control means including first and second control elements for sequentially controlling the movement of the carriage between the initial position and the first and second doffing positions, said first control element initiating movement between the initial position and the first doffing position and stopping movement of the carriage when the carriage reaches the first doffing position and thereafter initiating movement between the first and second doffing positions, said second control element stopping movement of the carriage when the carriage reaches the second doffing position and then returning the carriage to its initial position.

**3,977,616**

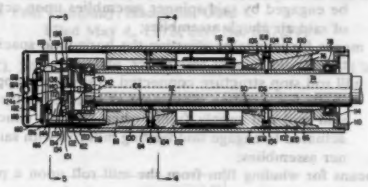
**YARN WINDING APPARATUS**

**Malcolm P. Owens, and Edgar E. Barnes, both of Charlotte, N.C., assignors to Fiber Industries, Inc., Charlotte, N.C.**

**Division of Ser. No. 411,560, Oct. 31, 1973, abandoned. This application Sept. 17, 1974, Ser. No. 506,701**

**Int. Cl.² B65H** *75/30, 79/00*

**U.S. Cl. 242—46.4** **4 Claims**



1. An improved bobbin supporting apparatus for use on a yarn winding machine comprising:

a. a stationary supporting shaft;

b. a bobbin securing means journaled to be freely rotatable on said shaft, said bobbin securing means comprising a plurality of ramps coupled to a plurality of fingers and spring means normally urging said fingers along the ramps to move radially outward to secure a bobbin;

c. a braking means engagable with said bobbin securing means for stopping rotation of said bobbin securing means about said shaft, said braking means including a braking surface engagable with said bobbin securing means and a first pneumatic diaphragm, said diaphragm causing engagement of said braking surface with the bobbin securing means;

d. a bobbin releasing means including a second pneumatic diaphragm and a connection to said fingers operative to move said fingers radially inward to a bobbin releasing position when said second diaphragm is expanded and to a bobbin grasping position when said diaphragm is relaxed; and

e. control means preventing operation of said bobbin releasing means until said braking means has stopped rotation of said bobbin securing means.

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**3,977,617**

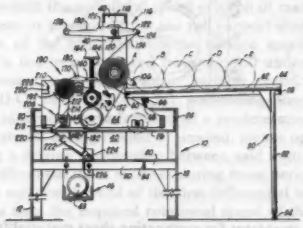
**FILM WINDING AND PERFORATING APPARATUS**

**Marion B. Salmon, P.O. Box 12322, Oklahoma City, Okla. 73112**

**Filed July 12, 1973, Ser. No. 378,645**

**Int. Cl.² B65H** *17/06, 23/08, 35/08*

**U.S. Cl. 242—56.8** **13 Claims**



1. Film winding and perforating apparatus comprising:

a frame;

means for positioning a mill roll on the frame in an unwinding position wherein said positioning means comprises:

a pair of air chuck subassemblies positioned on opposite sides of said frame, each of said air chuck subassemblies including a horizontally extending roll supporting

shaft horizontally reciprocable upon actuation of the respective air chuck subassembly;

spinner assemblies mounted on one end of each of said roll supporting shafts with said spinner assemblies facing each other and positioned for engaging opposite ends of a mill roll;

a mill roll supply frame for sequentially feeding a plurality of mill rolls to a position where one of said mill rolls can be engaged by said spinner assemblies upon actuation of said air chuck assemblies;

means for manually adjusting the horizontal spacing between said spinner assemblies; and

mill roll stop structure connected to said roll supporting shafts for arresting movement of selected mill rolls on said mill roll supply frame when said air chucks are actuated to engage said leading mill roll with said spinner assemblies;

means for winding film from the mill roll upon a product roll;

means for guiding film from the mill roll through a predetermined path to the product roll;

means along said predetermined path for scoring the film with transverse perforation lines;

a flexible drag brake sheet positioned to cradle, and bear against, a portion of the outer peripheral surface of said mill roll; and

means for supplying constant tension to said flexible drag brake sheet to maintain substantially constant, the force with which said drag brake sheet bears against the outer peripheral surface of said mill roll, said drag brake sheet being positioned across said mill roll adjacent the outer periphery thereof so that, as the diameter of the mill roll decreases with unwinding, the area of contact of the drag brake sheet against the outer peripheral portion of the mill roll gradually decreases, whereby the tension in the film being unwound from said mill roll is retained relatively constant at all times.

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## 3,977,618

## APPARATUS FOR AUTOMATICALLY CONNECTING THE SHEET MATERIAL OF ONE ROLL TO SHEET MATERIAL OF ANOTHER ROLL

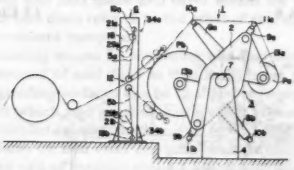
**Mikio Kato, Isehara, and Yasuhiro Kojima, Odawara, both of Japan, assignors to Nihon Electronic Industry Co., Ltd., Japan**

**Filed Mar. 1, 1974, Ser. No. 447,334**

**Claims priority, application Japan, Oct. 29, 1973, 48-120685**

**Int. Cl.² B65H *19/10***

**U.S. Cl. 242—58.3** **4 Claims**



1. In an apparatus for connecting sheet material from a first roll to the sheet material from a second roll without interrupting the feeding of the sheet material when changing from the first to the second roll, the sheet material of the second roll having the capability of becoming attached to the sheet material of the first roll in conjunctin with pressing of the sheet material of the first roll against an attaching portion at the outermost layer of the sheet material of the second roll, said attaching portion being axially shorter than the width of the sheet material of the second roll, frame means for supporting the first and second rolls with the first roll located in a feed position while sheet material is unwound therefrom, supporting means supporting the frame means for movement along a path displacing the first roll away from said feed position while the sheet material continues to be unwound therefrom and while simultaneously displacing the second roll into the feed position, combined pressing and rotating means having an operating position pressing the web of sheet material issuing from the first roll against the second roll at a location of the latter spaced axially beyond said attaching portion thereof while rotating the second roll, said support means supporting said combined pressing and rotating means for movement between a rest position and said operating position, attachment-effecting means connected for movement with said combined pressing and rotating means but spaced along the axis of said second roll at a location different from the location along said axis of said combined pressing and rotating means and in axial alignment with said attaching portion at said outermost layer of said second roll for pressing the sheet material of said first roll against said outermost layer of said second roll after rotation of the second roll by said combined pressing and rotating means has started, for effecting attachment of the sheet material of said second roll to the sheet material of said first roll, so that the sheet material starts to unwind from the second roll simultaneously with the travel of the sheet material from the first roll, and cutting means connected for movement with said attachment-effecting means for responding to operation of the latter effecting attachment of the sheet material of the second roll to the sheet material of the first roll for cutting across the web of sheet material issuing from the first roll at a location between the first roll and the connection of the outermost layer of the second roll to the web from the first roll, for terminating the feed from the first roll and continuing the feed with the sheet material from the second roll, said frame meanas supporting said first and second rolls for rotary movement about a pair of parallel horizontal axes, and said support means supporting said frame means for swinging movement around an intermediate axis situated between the axes of rotation of the first and second rolls during movement of the frame means along the path which displaces the first roll away from the feed position and the second roll into the feed position, said support means including a stand and a pair of idler rolls carried by said stand at the elevation of the feed position and defining between themselves a slot through which a web of sheet material moves when issuing from a roll at said feed position, and said stand carrying a pair of said combined pressing and rotating means respectively extending above and below said idler rolls for swinging movement from said rest positions respectively in opposite directions to said operating positions so that a web of sheet material on a roll at said feed position can issue either from the top or from the bottom thereof, each said combined pressing and rotating means having a said attachment-effecting means and a said cutting means connected for movement therewith.

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## 3,977,619

## METHOD AND APPARATUS FOR WINDING A CONTINUOUS FABRIC ON A CYLINDER IN A ROLL FORM

**Yasunori Nagata, Osaka; Hisakazu Ikui, Settsu; Takumi Kakiuchi, Settsu, and Masahiro Mori, Settsu, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan**

**Filed Dec. 19, 1973, Ser. No. 426,023**

**Claims priority, application Japan, Dec. 25, 1972, 48-434**

**Int. Cl.² B65H *17/02, 23/00***

**U.S. Cl. 242—67.1 R** **7 Claims**

1. In a system for winding a continuous fabric on a cylinder with a wrapping cloth wound therewith, apparatus for maintaining said fabric in a state of uniform tension comprising:

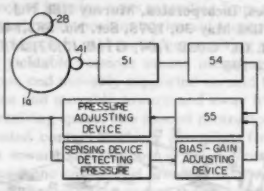
means for providing variable pressure against the outer winding of said fabric, including a press roller, a pneu-

matic cylinder urging said press roller against said fabric, an air inlet, and outlet valves for the compression chamber of said cylinder;

means for sensing the present diameter of fabric and cloth wound on said cylinder;

means for sensing the present pneumatic pressure in said chamber;

means for generating a first signal as a predetermined function of the sensed present diameter;




means for generating a second signal as a predetermined function of the sensed present pneumatic pressure;

means for developing a control signal as a predetermined function of said present diameter and said present pneumatic pressure, said means for developing operating responsively to the difference between said first and second signals; and

means for actuating said valves, in response to said control signal, thereby controlling the pressure of said press roller against said cylinder.

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**3,977,620**

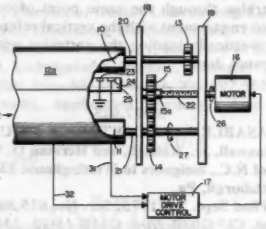
**REVERSIBLE DRIVE FOR FLEXIBLE WEB**

**Ronald F. Deuel, Utica, N.Y., assignor to Mohawk Data Sciences Corporation, Herkimer, N.Y.**

**Filed Sept. 29, 1975, Ser. No. 617,472**

**Int. Cl.² B65H *17/02***

**U.S. Cl. 242—67.4** **3 Claims**




1. A reversible drive mechanism for a flexible web in which first and second spools are adapted to receive first and second ends of the web, respectively, first and second gears are coupled to the first and second spools, respectively, so as to rotate said spool in opposite directions and a third gear is arranged to be shifted from engagement with one of the first and second gears into engagement with the other in order to reverse the motion of the web, characterized in that all the gears are mounted between first and second stops with parallel axes of rotation; that a drive motor is coupled to bidirectionally rotate a shaft upon which said third gear is mounted, said shaft and third gear having mating worm threads such that when the motor rotates the shaft in one direction, the third gear is against the first stop in engagement with and rotating the first gear in a first direction in which the first spool takes up the web and that when the motor reverses to rotate the shaft in the other direction, the third gear shifts longitudinally along the shaft until it reaches the second stop where it engages the second gear and rotates it in a second direction in which the second spool takes up the web.

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**3,977,621**

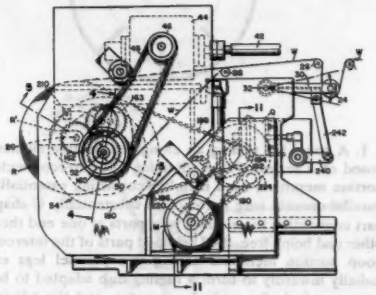
**DIFFERENTIAL DRIVEN REWINDER-UNWINDER**

**Harold Walter Huffman, Fairfield, Ohio, assignor to The Hamilton Tool Company, Hamilton, Ohio**

**Filed May 4, 1973, Ser. No. 357,391**

**Int. Cl.² B65H *23/20***

**U.S. Cl. 242—75.5** **26 Claims**



15. A web winding-unwinding machine including a drive shaft; a roll support shaft; a differential transmission intervening said shaft, wherein said transmission includes two input members and an output shaft; means driving said roll support shaft from said output shaft; means driving the first differential input member from said drive shaft at a predetermined, substantially constant rotational speed which is less than the required rotational speed of the roll support shaft at core roll size and which is greater than the required rotational speed of the roll support shaft at full roll size, wherein the required rotational speed of the roll support shaft is that rotational speed at which the peripheral speed of a roll of material being wound onto or unwound from the roll support shaft is, for all diameters of the roll, equal to the surface speed at which material is fed to or removed from the roll under predetermined tension; a variable torque, variable speed, reversible electric D.C. motor; means for controlling the rotational speed of said motor as a function of a predetermined tension on the material during rewind or unwind; means operable for providing a driving relationship between said motor and said second differential input member during those periods of time when the rotational speed of the first differential input member is less than the required rotational speed of the roll support shaft for a given diameter of a roll on said winding shaft; and other means operable for providing a driven relationship of said motor by said second differential input member during those periods of time when the rotational speed of the first differential input is greater than the required rotational speed of the roll support shaft, thereby increasing or decreasing the rotational speed imparted to said output shaft by the first differential input member whereby to rotate the roll support at required rotational speeds.

3,977,622

## REELING SPOOL

Walter Fecher, Grunstadt, Germany, assignor to Drahtwarenfabrik Drahtzug Stein KG, Drahtzug near Grunstadt, Germany

Filed Oct. 3, 1975, Ser. No. 619,452
Claims priority, application Germany, Jan. 29, 1975, 2503567; Mar. 21, 1975, 2512535
Int. Cl.² B65H 75/20
U.S. Cl. 242—77.2 8 Claims

1. A spool for reeling an elongated flexible element, composed of a series of like adjoining and interconnected hoop portion members, each member consisting essentially of two parallel arcuate wire parts and a substantially U-shaped wire part connecting the arcuate wire parts at one end thereof, the other end being free, the U-shaped parts of the interconnected hoop portion members having two parallel legs extending radially inwardly to form a reeling hub adapted to be placed on a mandrel of a reeling apparatus, and the adjoining and interconnected arcuate wire parts forming two parallel wire rings wherebetween the elongated flexible element may be reeled.

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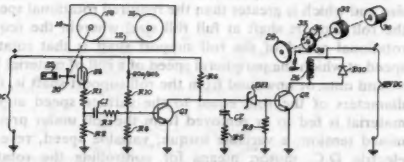
3,977,623

## FILM DRIVE MODE CHANGE ACTUATOR

John P. Bagby, Lake Forest, Ill.; Leonard A. Ferrari, San Clemente, Calif.; Erwin E. Figge, Des Plaines, and Kenyon A. Hapke, Libertyville, both of Ill., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 374,286, June 28, 1973, abandoned.
This application Jan. 21, 1975, Ser. No. 542,782
Int. Cl.² B65H 59/38; G03B 1/02; G11B 15/13
U.S. Cl. 242—191 10 Claims



1. A system for initiating operating mode change in a web handling apparatus which includes a rotatable, web handling reel, said system comprising:

energy storage means;

charging means for charging said energy storage means;

output circuit means for producing an output signal for initiating a mode change by the web handling apparatus when said energy storage means is charged above a predetermined level;

transducer means responsive to rotation of the web handling reel for producing a pulsating signal; and

discharge control means for overcoming said charging means to maintain said energy storage means discharged to a level below said predetermined level in response to the presence of said pulsating signal, whereby said energy storage means is charged to a level above said predetermined level to cause the production of said output signal when said pulsating signal terminates in response to cessation of rotation of the web handling reel.

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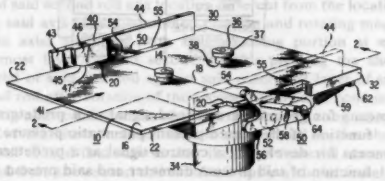
3,977,624

## LOCKING AND DRIVE MECHANISM FOR MAGNETIC TAPE CARTRIDGE

Noel Arthur Leifer, Pine Brook, and Jack Drake Raymore, Convent Station, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 30, 1975, Ser. No. 582,143
Int. Cl.² G03B 1/04; G11B 15/32, 23/04
U.S. Cl. 242—198 6 Claims



1. Apparatus for positioning a magnetic tape cartridge with respect to a stationary capstan drive, the magnetic tape cartridge being substantially rectilinear and having a forward edge and a notch on either side edge, comprising:

a bed for receiving the cartridge;

reference surface means in the bed for laterally positioning the cartridge side edges during insertion of the cartridge in the bed, and for vertically positioning the cartridge; and

cam means having a first surface contacted by the cartridge forward edge during the insertion, and a second surface responsive to substantial insertion of the cartridge for engaging the cartridge through the notch, to position the cartridge with respect to the capstan drive, and to urge the cartridge through the same point of contact therewith, into engagement with the vertical reference surface, thereby vertically loading the cartridge with respect to said capstan drive.

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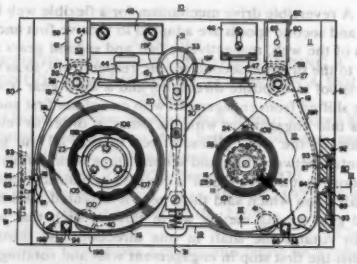
3,977,625

## RELEASABLE TAPE CARTRIDGE MOUNTING

Albert H. Maxwell, Jr., Raleigh, and Herman Q. Wilson, Clayton, both of N.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 23, 1975, Ser. No. 615,861
Int. Cl.² G03B 1/04; G11B 15/32, 23/04
U.S. Cl. 242—198 8 Claims



1. A tape deck including a releasable tape cartridge mounting for a cartridge including a housing having a pair of locator holes in a bottom side thereof, a pair of reels having driven

hubs rotatable in the housing with the hubs having circumferentially spaced holes exposed at the bottom side, and a recording tape wound on the reels for movement therebetween, said cartridge mounting comprising:

a base plate having a forward area carrying a tape transducer means, a cartridge support area for supporting said cartridge thereon in a tape playing position within a cartridge receiving space extending rearwardly from said forward area and immediately above said support area;

first and second locating posts extending from a rear area of said base plate for positioning in said locator holes when said cartridge is in said cartridge receiving space

a forward yieldable retainer means including arm means having one end movably supported on said forward area and a free end movable toward and away from said cartridge receiving space, two spaced protrusions each having rounded contact surfaces extending from said free end and toward said support area, and resilient means biasing said one end of said arm means toward said base plate such that said free end of the arm means is forced outward by engagement of the protrusions by an outer side of said cartridge housing upon insertion of said cartridge into the cartridge receiving space;

first and second guide plates extending in parallel relationship immediately adjacent opposite sides of said cartridge receiving space; and

a rear yieldable retainer means including first and second resiliently biased catch members each having rounded contact surfaces movably mounted in facing relationship at opposite rear portions of said first and second guide plates for movement into and away from the cartridge receiving space, said first and second catch members being forced outwardly by initial insertion of said cartridge along said first and second guide plates and being in engagement with the outer side of said cartridge when said cartridge is received in said cartridge receiving space.

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**3,977,626**

## MAGNETIC TAPE CARTRIDGE

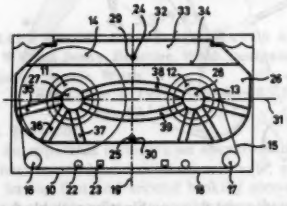
**Dieter Gaiser, Diersheim; Gustav Loewenberg, Ludwigshafen; Horst Fitterer, Heidelberg-Hasenleiser, and Uwe Woweries, Bad Duerkheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Aug. 15, 1974, Ser. No. 497,665**

**Claims priority, application Germany, Aug. 17, 1973, 7330078**

**Int. Cl.[2] G11B** *23/10*

**U.S. Cl. 242—199** **6 Claims**



1. A magnetic tape cartridge with at least one tape-winding hub and with a pair of liners arranged symmetrically with respect to the mid-plane of the cartridge and interposed between the pack of wound tape and the upper and lower cartridge walls, respectively; said liners having end portions formed with an inclination towards said mid-plane so as to angle towards each other, in a direction radially outwardly of said hub, from a radially inner zone where they are at a substantial distance from the tape pack to and beyond a radially outer zone at which outer zone they engage the outer turns of the tape pack and so as to provide between them a guide channel for said outer turns, said channer at its bottom being delimited by the tape pack itself; and said liners having, spaced from said end portions in a direction opposite to said first-mentioned direction, other portions including resilient zones which engage the central area of the hub and tape pack combination to locate said combination in said mid-plane of the cartridge.

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**3,977,627**

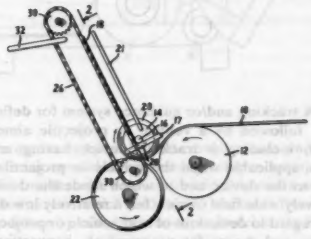
## WINDING AND SLITTING APPARATUS

**George Holger Sundin, Duluth, Minn., assignor to Conwed Corporation, St. Paul, Minn.**

**Filed June 25, 1973, Ser. No. 372,802**

**Int. Cl.[2] B65H** *17/08, 35/02*

**U.S. Cl. 242—56.3** **6 Claims**



1. Apparatus for simultaneously winding and cutting sheet material comprising:

a. wind-up means including a spindle;

b. a drive roll for advancing the sheet material toward the wind-up means;

c. means for driving the drive roll;

d. rotatable cutter means positioned after the drive roll and before the wind-up means operative to be rotated in the same direction as the drive roll, the cutter means being in an adjustably fixed position;

e. means for rotating the cutter means;

f. guide means for maintaining the wind-up means in position with respect to the drive roll and cutter means, the guide means comprising a first pair of spaced parallel guide members disposed in a first plane at an acute angle from the vertical and a second pair of spaced parallel retaining members disposed in a second plane spaced from and parallel to the first plane, the guide and retaining members being disposed in a direction away from the drive roll so that the wind-up spindle is continuously movably retained between the guide and retaining members by gravity and the movement of the wind-up means; and

g. the relative positions of the drive roll, the cutter means and the guide and retaining members being such that the drive roll is spaced from the wind-up means at least during the starting of winding thereof and such that gravity maintains at least the outer layer of the material being wound in continuous contact with the cutter means such that rotation of the wind-up means is effected solely by rotation of the cutter means during the initial period of winding the wind-up means and as the size of the rolled material increases, the rolled material and wind-up means will move upwards between the guide and retaining members due solely to winding and gravitational forces, and be driven primarily by the drive roll.

## 3,977,628
## TRACKING AND/OR GUIDANCE SYSTEMS

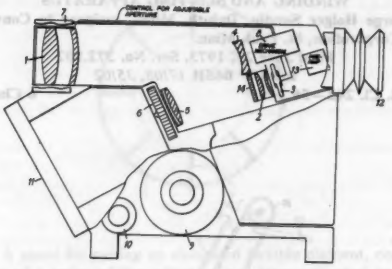
**Donald Robert Barron, Sunbury-on-Thames, England, assignor to EMI Limited, Hayes, England**

**Filed Nov. 21, 1974, Ser. No. 526,044**

**Claims priority, application United Kingdom, Nov. 23, 1973, 54509/73**

**Int. Cl.² F41G 7/00**

**U.S. Cl. 244—3.16** **7 Claims**



1. A tracking and/or guidance system for defining a course to be followed by a vehicle or projectile aimed towards a target, including a tracking device having an acquisition mode, applicable when the vehicle or projectile is relatively close to the device and in which mode the device exhibits a relatively wide field of view but a relatively low discrimination with regard to deviations of said vehicle or projectile from said course, and means for progressively converting said device from operation in said acquistion made to operation in a tracking mode, in which it exhibits a relatively narrow field of view but a relatively high discrimination with regard to said deviations, as the distance between the vehicle or projectile and the device increases, the said device comprising:

a. objective lens means adapted to receive radiant energy, from said vehicle or projectile,

b. field lens means arranged to receive radiant energy from said objective lens means and being disposed in the focal plane thereof,

c. detecting means having a surface sensitive to said radiant energy and adapted to receive radiant energy from said field lens means, the detecting means being arranged to produce electrical output signals indicative of said deviations, and

d. drive means operative on said detecting means and effective

i. in said acquisition mode to space said detecting means from said field lens means by a predetermined distance so that said radiant energy received by said surface is diffused over a substantial part of said surface, and

ii. in response to, and concomitently with, increasing distance of said vehicle or projectile from said device to progressively reduce the spacing between said detecting means and said field lens means so that said radiant energy is focused with increasing sharpness on said surface as the distance between the vehicle or projectile and said device increases.

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## 3,977,629
## PROJECTILE GUIDANCE

**Jean Tubeuf, Le Chesnay, France, assignor to Societe Europeene de Propulsion, Paris, France**

**Filed Sept. 19, 1974, Ser. No. 507,565**

**Claims priority, application France, Sept. 21, 1973, 73.34005**

**Int. Cl.² F41G 9/00**

**U.S. Cl. 244—3.22** **5 Claims**

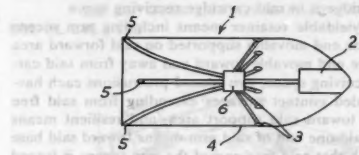
1. In combination with a spinning projectile having no external aerodynamic control surfaces the improvement of a projectile control system which comprises:

a. means for signalling trajectory correction instructions;

b. means defining at least one entry port for the ambient fluid medium;

c. means defining at least one exit port for said ambient fluid medium and means connecting said exit and entry ports;

d. said entry and exit ports being offset relative to the longitudinal axis of symmetry of said projectile;



e. said connecting means comprising an assembly of fluidic circuits; and

f. magnetostrictive means responsive to said trajectory instructions signalled by a control means for regulating the flow of fluid through at least one of said fluidic circuits for controlling flow through at least one of said entry and exit ports.

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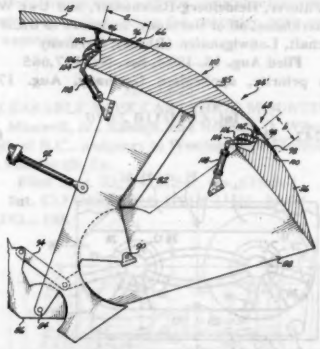
## 3,977,630
## STOL AIRCRAFT

**Delbert S. Lewis; David A. Norton, both of Bellevue; Robert P. Person, Mercer Island; George S. Schairer, Bellevue, and John K. Wimpress, Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Continuation of Ser. No. 339,734, March 9, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,674**

**Int. Cl.² B64C 21/08**

**U.S. Cl. 244—43 DB** **18 Claims**



1. A wing, engine and flap combination suitable for use by an aircraft, said combination comprising:

1. a wing defining an upper airfoil surface;

2. an engine associated with said wing and suitable for generating a lift enhancing exhaust stream when said exhaust stream is directed downwardly, said engine having an exhaust nozzle from which said exhaust stream exits, said exhaust nozzle mounted in relationship to said wing so as to direct said exhaust stream along a path that extends rearwardly across the upper airfoil surface defined by said wing;

3. a flap affixed to said wing and located at the aft end thereof, said flap being movable between a retracted

position and extended positions so as to extend said upper airfoil surface rearwardly and downwardly when in said extended positions, said flap and said wing so constructed and arranged as to be capable of defining a longitudinal spanwise slot in said upper airfoil surface between said flap and said wing when said flap is in an extended position;

4. flap actuating means associated with said flap for moving said flap between said retracted position and said extended positions;

5. slot closure means associated with said flap and said wing for opening and closing said longitudinal spanwise slot in said upper airfoil surface when said flap is in an extended position, said slot closure means being movable between

a. a closed position wherein said slot closure means closes said longitudinal spanwise slot in said upper airfoil surface and conjunctively forms with said wing and said flap a smooth upper airfoil surface configured so as to cause attachment of said exhaust stream to said upper airfoil surface and to turn said attached exhaust stream downwardly along said upper airfoil surface to create a longitudinal thrust component and a normal thrust component, and

b. an open position wherein said slot closure means opens said longitudinal spanwise slot and allows ambient air to pass therethrough.

15. A method of controlling the drag and lift components acting on an aircraft in which an exhaust stream from an engine is directed over an upper airfoil surface of a wing and trailing edge flap located on the aft end of said wing and selectively extendable from a retracted cruise position to a plurality of extended positions such that the angle the chordline defined by said flap makes with the chordline defined by said wing can be varied, said trailing edge flap having an upper curved surface so configured and arranged as to form, when extended, a surface to which said exhaust stream can adhere and turn downwardly and rearwardly to create both longitudinal and normal thrust components, said method comprising the steps of:

extending said trailing edge flap; and, selectively controlling both the opening and closing of a slot formed between said wing and said flap when said flap is extended, so that a smooth continuous curved surface that extends downwardly and rearwardly from said upper airfoil surface of said wing to which said exhaust stream can adhere to and turn about is formed when said slot is closed, said smooth continuous curved surface becoming discontinuous when said slot is opened to allow ambient air to flow between said wing and said flap.

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**3,977,631**

## AIRCRAFT WHEEL DRIVE APPARATUS AND METHOD

**Robert William Jenny, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed June 4, 1975, Ser. No. 583,598**

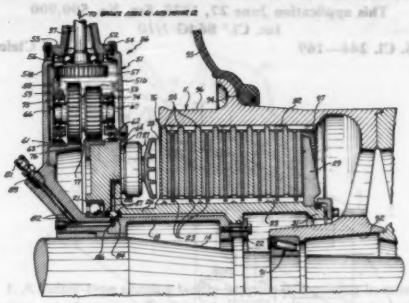
**Int. Cl.² B64C *25/42***

**U.S. Cl. 244—50** **7 Claims**

1. In an apparatus including an aircraft wheel axle, an aircraft wheel rotatably mounted on said axle, and a brake assembly having first and second braking element means and actuator means therefor, the combination therewith comprising:

rotatably drivable brake carrier means rotatably mounted on said axle concentrically with said wheel, said first braking element means being mounted on said carrier means and said second braking element means being mounted on said wheel and said first and second braking element means being relatively movable by said actuator means between a condition of disengagement therebetween allowing relative rotation between said wheel and carrier means, and a condition of engagement therebetween restraining relative rotation between said wheel and carrier means;

drive means coupled to said brake carrier means and having selective drive and nondrive conditions, said drive means being operable in its drive condition to rotate said carrier means; and



controllable means coupled to said carrier means and having a restraint condition restraining relative rotation of said carrier means with respect to said axle and a nonrestraint condition in which said carrier means is free to be rotatably driven by said drive means in its drive condition.

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**3,977,632**

## HELICOPTER POWER TRANSMISSION SYSTEMS

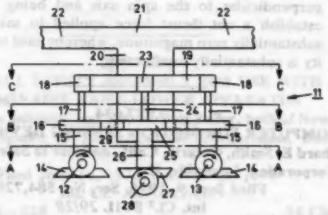
**Kenneth Watson, Yeovil, England, assignor to Westland Aircraft Limited, Yeovil, England**

**Filed Jan. 31, 1975, Ser. No. 546,109**

**Claims priority, application United Kingdom, Feb. 18, 1974, 7344/74**

**Int. Cl.² B64C *27/12*; B64D *35/08***

**U.S. Cl. 244—60** **12 Claims**

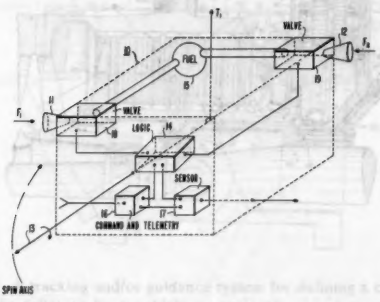


1. In or for a helicopter having a plurality of engines providing shaft power to drive a rotor system, a power transmission system for transmitting torque from the engines to the rotor system and comprising, for each engine, drive shafting and associated gearing including an individual final drive gear for transmitting torque from each engine to a common output gear for connection to the said rotor system, a common idler gear interconnecting the respective gearings and a torsionally flexible drive shaft for transmitting torque between the idler gear and each said final drive gear so as to distribute available engine torque amongst the full complement of said final drive gears.

## 3,977,633
## ORIENTATION SYSTEM FOR A SPIN STABILIZED SPACECRAFT

John Edward Keigler, Princeton; Ludwig Muhlfelder, Livingston, and Robert Joseph Cenker, Princeton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 416,579, Nov. 16, 1973, abandoned.
This application June 27, 1975, Ser. No. 590,900
Int. Cl.² B64G 1/10
U.S. Cl. 244—169 5 Claims




1. A system for changing attitude of a spin-stabilized vehicle having a spin axis without affecting vehicle velocity comprising:

inertial sensing means connected to said vehicle for detecting an inertial point of reference and generating a pulsed signal in response to said detected inertial point of reference;

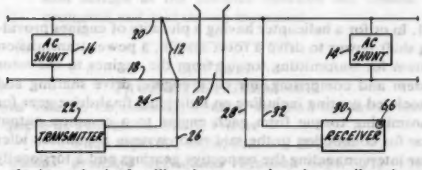
means coupled to said inertial sensing means for generating pulsed vehicle attitude control signals in response to said inertial sensor generated signal; and

a pair of coplanar reaction means mounted on said vehicle in a plane parallel to said spin axis and operating in response to said vehicle attitude control signals for applying to said vehicle equal and opposite thrust forces perpendicular to the spin axis of said vehicle and for forming a couple producing a vehicle attitude changing torque perpendicular to the spin axis and being arranged to establish a net thrust force applied to said vehicle of substantially zero magnitude, whereby said vehicle velocity is substantially unaffected.

## 3,977,634
## COMPUTER FOR MOTION SENSING DEVICE SETUP

Richard E. Smith, Ontario, Calif., assignor to Safetran Systems Corporation, Louisville, Ky.

Filed June 9, 1975, Ser. No. 584,729
Int. Cl.² B61L 29/28
U.S. Cl. 246—128 8 Claims




1. A method of calibrating a receiver in a railroad grade crossing protection system having a transmitter and receiver connected to the rails and a defined approach track section including the steps of:

a. providing an electrical signal indicative of ballast condition,

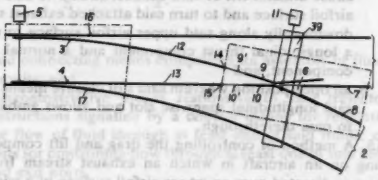
b. comparing said ballast signal with $E_D$,

c. varying receiver gain until the variation between $E_D$ and said ballast signal is within predetermined limits.

## 3,977,635
## RAILWAY SWITCH FOR VIGNOLES RAILS

Robert Pirker, Zeltweg, and Hannes Lindner, Leoben, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed June 5, 1975, Ser. No. 584,199
Claims priority, application Austria, Oct. 15, 1974, 8275/74
Int. Cl.² E01B 7/00
U.S. Cl. 246—387 8 Claims



1. In a railway switch for Vignoles rails, comprising a frog tip and wing rails fixed at one point and arranged for swivelling movement, each of said wing rails being moveable to an end position in which it engages the frog tip, means for shifting said wing rails to said end positions and additonal separate means supported against the railway sleepers and supporting each of said wing rails in its respective end position, said additional means including for each wing rail a supporting rod extending over the distance between said shifting means and the point of fixation of the respective wing rail to a sleeper and being guided in a longitudinal direction of the corresponding wing rail by means of fixed guide members each of said supporting rods having supporting surfaces cooperating with a plurality of abutments fixed to and protruding from the web of the respective wing rail whereby the support by said supporting rods is provided in a direction which brings one of the said wing rails into engagement with the frog tip, each of said supporting rods having recesses for receiving the abutments of the respective wing rail when the latter is in engagement with the frog tip, said means for shifting the wing rails being coupled to said additional means for supporting the wing rails for movement in mutual dependence.

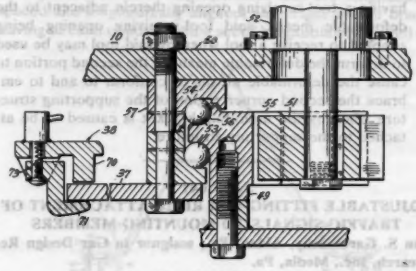
## 3,977,636
## TURNTABLE

Hermann Karl Bumueller, 95 Dequire Blvd., Montreal, Quebec, Canada

Continuation-in-part of Ser. No. 271,052, July 12, 1972, Pat. No. 3,823,902. This application July 10, 1974, Ser. No. 487,160
Int. Cl.² A47B 21/00
U.S. Cl. 248—2 12 Claims

1. A turntable unit comprising a stationary nonrotatably first member, a second member, mounting means rotatably mounting said second member on said first member, said second member including a supporting platform adapted to support a construction assembly; drive means for rotating said second member on said first member, a flat circular friction surface at a periphery of one of said members, braking means separate and apart from said drive means mounted on the other of said members for engaging said flat circular friction surface for holding said second member stationary relative to said first member, said first member defines the inner race of a double ballbearing arrangement and the second member is

disc-shaped with a downwardly extending annular skirt defining the outer race of said double ballbearing arrangement; said first member having an inwardly facing gear ring engaging a pinion gear on a shaft mounted for rotation with said second



member and driven by a motor mounted on said second member; a flange extending radially outwardly from said annular skirt and a plurality of spring loaded disc brakes mounted on said first member at spaced intervals around said second member adapted to engage said flange.

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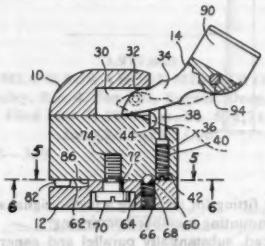
**3,977,637**

## UTILITY IMPLEMENT HOLDER

**Tommy J. Newton, Easley, S.C., assignor to Thomas M. Hughes, Taylors, S.C.**

**Filed Dec. 16, 1974, Ser. No. 532,931**
**Int. Cl.² A47G *25/12***
**U.S. Cl. 248—514** **8 Claims**



1. A holder device for supporting a utility implement such as a fishing rod and lantern comprising:

a base member adapted to be mounted on a side of a boat and the like including an elongated substantially horizontal socket formed therein having an entrance opening,

a releasable coupling member adapted to removably carry said implement having an arm element rigidly depending downwardly therefrom being received in said socket,

a cam portion formed adjacent an outer end of said arm element being slideably received and engaged in said elongated socket,

resilient biasing means positioned adjacent said entrance opening providing an upward biasing force against a surface of said arm element to hold said arm element in the elongated socket,

said arm element and hence said coupling member being releaseably secured in said elongated socket and base member until said arm element is tilted angularly backwards to depress said upward biasing means permitting said cam portion to ride against an upper surface of said socket when being pulled outwardly therefrom.

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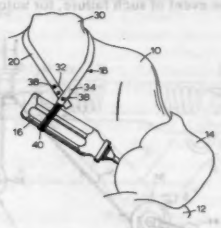
**3,977,638**

## HALTER TYPE NURSING BOTTLE SUPPORT

**James M. Woodard, 450 S. Queen St., York, Pa. 17403**

**Filed May 14, 1975, Ser. No. 577,327**
**Int. Cl.² A61J *9/06***
**U.S. Cl. 248—102** **2 Claims**



1. A halter-type nursing bottle support comprising in combination, an elongated flexible strap adapted to extend around the neck of a person holding an infant to be fed from a nursing bottle, said flexible strap being formed from a strip of fabric folded upon itself longitudinally to form a flattened tubular two-ply strap, means securing the outer horizontal edges of said strap of fabric together to stabilize said flattened tubular strap, means adjacent opposite ends of said strap releasably engageable to secure said ends together in overlapping condition to lie flatly in use upon the chest of said person, a strip of elastic material of uniform width having a length slightly less than the circumference of a nursing bottle, the ends of said strip being disposed in flat overlying relationship to form a normally flattened loop the flat overlying ends of said flattened loop of elastic material being inserted within one end of said flattened strip of fabric, and connecting means securing said inserted end of said flattened loop of elastic material to said one end of said flattened strip of fabric comprising said flexible strap in coaxial relationship therewith, said flattened loop of elastic material being adapted to be expanded to encircle a nursing bottle to securely engage the same intermediately of the ends thereof and support said bottle from said one end of said strap when encircling the neck of a person to position said bottle to nurse an infant when held in the arm of said person and thereby free the hands of said person for other uses.

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**3,977,639**

## FREE FALL SAFETY ASSEMBLY FOR USE WITH A LUMINAIRE RAISE-LOWER APPARATUS

**Brady Glenn Johnson, and Robert Dale Zeller, both of Newark, Ohio, assignors to Johns-Manville Corporation, Denver, Colo.**

**Filed June 16, 1975, Ser. No. 587,444**
**Int. Cl.² A47G *29/00***
**U.S. Cl. 248—125** **14 Claims**

1. An auxiliary assembly for use with an apparatus which raises and lowers a luminaire support along a support pole and which supports said luminaire support during this movement, said apparatus including main drive means and main cable means connected with said drive means and with said support for movement with said support, said assembly comprising:

a. an auxiliary supporting arrangement including

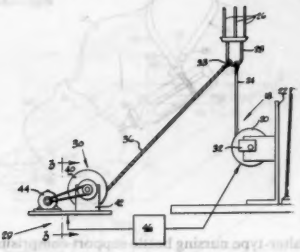
i. auxiliary cable means connected with said main cable means at a specific point between said luminaire support and said main drive means, said specific point separating said main cable means into an upper portion located between said support and point and a lower portion located between said point and said main drive means.

ii. auxiliary cable support means supporting said auxiliary cable means for movement with said main cable means

during the raising and lowering of said luminaire support, and

iii. means for maintaining said auxiliary cable means taut;

b. means cooperating with said apparatus for automatically and substantially immediately sensing the presence of a failure of said main drive means or said lower portion of said main cable means to support said luminaire support and, in the event of such failure, for automatically providing a predetermined signal at substantially the moment of said failure; and



c. cable movement affecting means cooperating with said auxiliary supporting arrangement for at least slowing down movement of said auxiliary cable means in response to said predetermined signal, whereby to at least slow down movement of said upper portion of said main cable means to maintain said luminaire support in a cable supported position during said failure.

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**3,977,640**

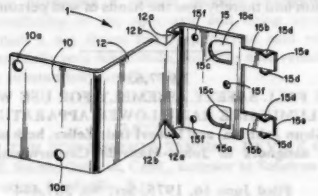
**BRACKETS FOR MOUNTING ELECTRICAL WIRING BOXES TO SUPPORTING STRUCTURES**

**William O. Arnold, Parkersburg, W. Va., and Gene F. Mills, Belpre, Ohio, assignors to Union Insulating Company, Parkersburg, W. Va.**

**Filed Oct. 14, 1975, Ser. No. 621,677**

**Int. Cl.² H02G *3/08*; F16B *2/24*, *15/00***

**U.S. Cl. 248—205 R** **14 Claims**



1. A mounting bracket for mounting a box to a metal supporting structure and adapted to be attached to the supporting structure, said supporting structure having a first corner region and a second corner region adjacent to the first corner region, said mounting bracket comprising:

a first portion adapted to be attached to a box and including embracing means generally conforming to the configuration of the first corner region of the supporting structure and adapted to embrace said first corner region in preparation for attaching the mounting bracket to the supporting structure; and

a second portion connected with the first portion and adapted to be positioned against the supporting structure between the first and second corner regions of the supporting structure in preparation for attaching the mounting bracket to the supporting structure, said second portion including deformable means capable of being deformed by a tool and arranged initially to extend past the second corner region of the supporting structure and, when deformed, to conform generally to the configuration of and embrace the second corner region of the supporting structure, and said second portion further having a tool-receiving opening therein adjacent to the deformable means, said tool-receiving opening being adapted to receive a tool whereby said tool may be used to deform the deformable means of the second portion to cause the deformable means to conform to and to embrace the second corner region of the supporting structure whereby the mounting bracket is caused to be attached to the supporting structure.

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**3,977,641**

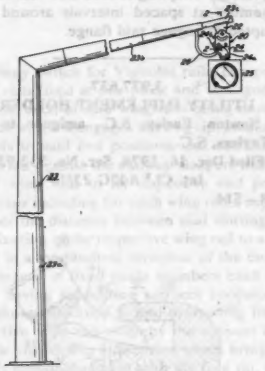
**ADJUSTABLE FITTING FOR RIGID ATTACHMENT OF TRAFFIC SIGNALS TO MOUNTING MEMBERS**

**John S. Garchinsky, Aldan, Pa., assignor to Gar Design Research, Inc., Media, Pa.**

**Filed Dec. 11, 1974, Ser. No. 531,451**

**Int. Cl.² F16M *13/00*, *13/02***

**U.S. Cl. 248—278** **24 Claims**



1. A hanger fitting for attaching a traffic signal assembly or the like to a mounting member comprising:

a. two spaced, substantially parallel and generally planar rigid portions each of said portions having

i. a transverse aperture aligned with a corresponding aperture in the other portion, and

ii. means for enabling engagement of said mounting member thereby to prevent movement of said fitting with respect to said member in at two substantially mutually perpendicular directions,

b. an intermediate portion coupled to said rigid portions which joins said rigid portions at their sides, and

c. a lower portion coupled to said intermediate portion which includes means adapted to be coupled to said signal assembly.

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**3,977,642**

**SUPPORT STRUCTURE**

**Bobbie L. White, Shreveport, La., assignor to Gym-Dandy, Inc., Bossier City, La.**

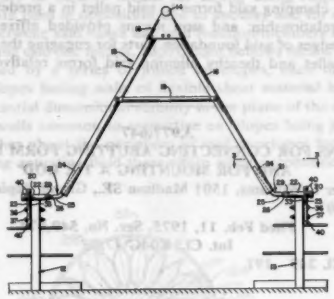
**Filed Feb. 24, 1975, Ser. No. 552,370**

**Int. Cl.² A47F *5/00***

**U.S. Cl. 248—309 R** **9 Claims**

1. Apparatus for mounting an assembly having a plurality of angularly downwardly extending downwardly open legs upon

upright support means comprising bracket mounting means on said support means and bracket structure at each leg including angle bracket means having an upwardly angularly extending arm for telescopic connection to the associated leg and generally horizontal arm means adapted to extend adjacent said mounting means and provided with a plurality of through fastener receiving apertures that are longitudinally spaced and longitudinally aligned, an upright anchor bracket having at each opposite end a set of longitudinally spaced and



longitudinally aligned fastener receiving apertures, the apertures of each set extending at substantially right angles to the apertures of the other set, means for securing said angle bracket means to said anchor bracket comprising fastener means passing through an aperture of the upper of said sets and an aperture of said apertured arm means, and means for securing the bracket structure to said support means comprising fastener means extending through at least one of said lower set of apertures in the anchor bracket to said mounting means.

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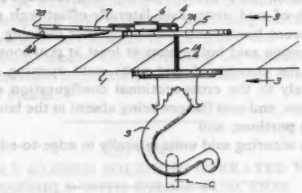
**3,977,643**

## SUPPORT MEANS FOR A HOOK MEMBER OR THE LIKE

David R. Staley, Rte. 4, Box 702, Eugene, Oreg. 97405

Filed May 7, 1975, Ser. No. 571,712
Int. Cl.² B42F *13/00*
U.S. Cl. 248—339 9 Claims



1. Support means for a ceiling attachment, said support means comprising in combination,

a ceiling attachment for supporting a load,

a segment of flexible wire secured to said attachment and adapted for inserted passage through a ceiling opening of a size corresponding to the wire diameter,

a load bearing plate member in place on the opposite side of the ceiling from said ceiling attachment,

a wire locking plate defining an opening thru which extends a portion of said flexible wire segment, and

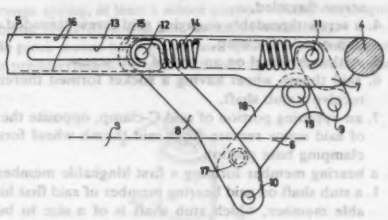
means removably coupling the wire locking plate on said load bearing plate member to retain said locking plate and said wire in place against loads imparted to the ceiling attachment.

**3,977,644**

## SEAT CONSTRUCTION

Klaus Sturhan, Lemgo, Germany, assignor to Gebr. Isringhausen, Lemgo, Lippe, Germany

Filed June 24, 1974, Ser. No. 482,474
Claims priority, application Germany, June 25, 1973, 2332238
Int. Cl.² A45D *19/04*
U.S. Cl. 248—384 10 Claims



1. In a seat, particularly a vehicle seat, a combination comprising a support element; a seat element above said support element; and means for adjusting the position of said elements relative to one another, comprising an elongated strap connected to said seat element, a bracket of substantially U-shaped configuration having a bight and two arms extending transversely of said bight substantially in the same direction and bounding with said bight an open side of said bracket, one of said arms having a length substantially corresponding to that of said strap and being pivotally connected to the latter, said bracket being mounted on said support element for pivoting about an axis, and means for pivoting said bracket about said axis and including an elongated lever extending away from said open side and having longitudinally spaced ends one of which is pivotally connected to the other arm of said bracket and the other of which is mounted in said seat element for shifting in a substantially horizontal plane between, and for arresting in a selected one of a plurality of positions.

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**3,977,645**

## UNIVERSALLY MOVABLE MIRROR WITH A UNIVERSAL MOUNTING CLAMP

Carroll Leo Deely, 9234 Rockbrook Drive, Dallas, Tex. 75220

Filed July 9, 1975, Ser. No. 594,520
Int. Cl.² F16C *11/06*; B60R *1/04*
U.S. Cl. 248—484 4 Claims

1. A universally movable, demountable mirror comprising;

a. a C-clamp
1. said C-clamp having two sockets formed therein with the axes thereof being parallel, which sockets are positioned in opposed relation on said C-clamp to receive a stub shaft therein,
2. said C-clamp having an opening formed therein which opening passes transversely therethrough at a right angle to the axes of said sockets, which opening is adapted to receive a stub shaft in either end thereof,
3. an outwardly extending portion of said C-clamp being screw threaded,
4. a screw threadably engaging said screw threaded portion of said C-clamp,
5. A thumb wheel on an end of said screw,
6. said thumb wheel having a socket formed therein to receive a stub shaft,
7. an opposing portion of said C-clamp, opposite the end of said screw remote from said thumb wheel forms a clamping base portion.
b. a bearing member forming a first hingeable member,
1. a stub shaft on said bearing member of said first hingeable member, which stub shaft is of a size to be received in the sockets of said C-clamp and the socket of said thumb wheel in close fitting relation,
c. a first arm,
1. side plates on an end of said first arm and being engageable with said bearing member in complementary friction relation,
d. screw and lock means positioned on said side plates to bindingly engage said side plates with said bearing member to retain said first arm in adjusted relation with respect to said bearing member,
e. a second arm having a similar bearing member thereon and similar side plates,
1. said first arm and said second arm lying in the same plane,
f. a mirror universally mounted on said second arm remote from said stub shaft, for movement to a selected position.

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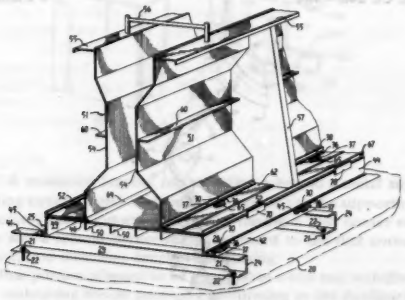
**3,977,646**

## APPARATUS FOR MOLDING CONCRETE GIRDERS

**John C. Moon, Ridgeland, and Tom C. Brown, Jackson, both of Miss., assignors to Madison Materials Co., Ridgeland, Miss.**

**Filed Sept. 5, 1974, Ser. No. 503,470**
**Int. Cl.[2] B28B 7/00**
**U.S. Cl. 249—50** **11 Claims**



1. A mold for the manufacture of concrete structural members such as girders, the mold comprising: a concrete base; a plurality of parallel beams affixed to said base and having their upper surfaces in the same plane; a pallet which comprises a plurality of pallet sections mounted on said beams, said sections being aligned and rigidly connected; a pair of removable side forms provided on said pallet, each said form comprising a horizontal foundation part which extends directly above said pallet to the edge of said pallet, a generally vertical molding part extending upwardly from the inner portion of said foundation part and which faces the molding part of the other said side form, an upper flange part which extends normally from the top of said molding part, and vertical plates connecting said parts; a plurality of openings in said foundation parts aligned with further openings in said pallet, said openings being disposed adjacent said molding part, readily removable clamp means extending through said aligned openings for rigidly clamping said forms to said pallet in a predetermined fixed relationship; and stop means provided affixed to the outer edges of said foundation parts for engaging the edges of said pallet and thereby aligning said forms relative to said pallet.

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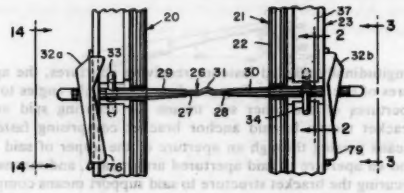
**3,977,647**

## MEANS FOR CONNECTING ABUTTING FORM PANELS AND FOR MOUNTING A TIE ROD

**Chester I. Williams, 1501 Madison SE., Grand Rapids, Mich. 49507**

**Filed Feb. 11, 1975, Ser. No. 549,074**
**Int. Cl.[2] E04G 17/08**
**U.S. Cl. 249—191** **3 Claims**




1. A modular form system including a plurality of units assembled edge-to-edge in coplanar relationship each including a panel adapted to confine poured concrete, marginal beams adjacent the vertical edges of said panel and secured thereto, said beams each having a web portion normal to said panel and flanges along said web portion generally parallel to said panel, and a plurality of tie assemblies including bolt means traversing said panels and secured with respect thereto, wherein the improvement comprises:
laterally-offset web portions on said marginal beams and panel on the edges thereof defining the edge periphery of each of said units, said laterally-offset web portions on adjacent beams and panels together defining an opening receiving said bolt means at least at positions intermediate the corners of said units, said opening conforming closely to the cross-sectional configuration of said bolt means, and said flanges being absent at the laterally-offset web portions; and
means securing said units laterally in edge-to-edge relationship.

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**3,977,648**

## ROTARY MOTION VALVE AND ACTUATOR

**James W. Sigmon, Charlotte, N.C., assignor to Sigmon Corporation, Charlotte, N.C.**

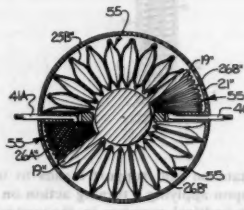
**Continuation-in-part of Ser. No. 358,169, May 7, 1973, abandoned. This application June 27, 1974, Ser. No. 483,829**
**Int. Cl.[2] F16J 3/04; F16K 31/126**
**U.S. Cl. 251—59** **7 Claims**

5. A rotary motion actuator comprising:
first means defining a central longitudinal axis and at least two vanes extending radially outwardly of said axis and spaced one from another circumferentially thereabout,
second means encircling said first means and defining a generally right circular cylindrical encircling surface

concentric with said axis and a number of reaction members corresponding to the number of said vanes, each of said reaction members extending radially inwardly toward said axis and being interposed circumferentially adjacent ones of said vanes,

one of said first and second means being supported for rotation about said axis relative to the other of said first and second means and said other means being fixed against rotation about said axis,

a plurality of bellows means for acting along respective arcuate lines in opposition one to another and for exerting between said vanes and said reaction members forces rotating said one means, each of said bellows means being defined by a series of joined envelopes, each of said envelopes having walls of flexible sheet material having substantial dimensional stability in the plane of the sheet, said walls common to respective envelopes being joined together about the periphery of said envelopes for containing actuating fluid therewithin while accommodating




separation of said walls upon expansion of said bellows means, adjoining walls of adjacent envelopes being joined together in minor areas centered about centers spaced from the centers of the peripheries of said adjacent envelopes, said envelopes communicating through said minor areas for distribution of actuating fluid through said bellows means, and said envelopes imparting to said bellows means an inherent tendency to form when expanded a segment of a solid of revolution, and being interposed between a reaction member and a vane so that each reaction member and each vane extends between an opposing pair of said bellows means,

each of said bellows means being loosely inserted between a corresponding one said vane and one said reaction member for freely assuming whatever position of engagement therewith and with said encircling surface as is appropriate to any stresses of operation, and

fluid pressure means for distributing an actuating fluid under pressure to circumferentially alternate ones of said bellows means.

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**3,977,649**

## NORMALLY CLOSED SOLENOID OPERATED VALVE ASSEMBLY WITH RELIEF FUNCTION

**Kenneth W. Zeuner, Newtown, and Alonzo B. Jarman, Wrightstown, both of Pa., assignors to Control Concepts, Inc., Newtown, Pa.**

**Continuation of Ser. No. 387,606, Sept. 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 257,532, May 30, 1972, abandoned. This application Sept. 4, 1975, Ser. No. 610,291**

**Int. Cl.² F16K *31/42***

**U.S. Cl. 251—82** **7 Claims**

1. A solenoid operated valve assembly which is normally closed when unenergized for providing a relief function in which upstream pressure flows into an upstream flow channel and out of a downstream flow channel of said valve assembly comprising

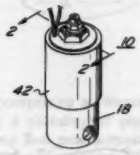
an orifice in fluid communication between said upstream and downstream flow channels,

plug means movable between a valve normally closed state seating in and closing said orifice and a valve open state,

a movable armature having (1) a chamber for slidably receiving a major portion of said plug means and (2) a section for engaging and pulling said plug means to said valve open state,

a range spring having one end engaging only said plug means and tending to bias solely said plug means to said valve closed state until the upstream force of fluid is sufficient to overcome a preselected spring force of said range spring, at least a minor portion of said range spring being received within said armature chamber,

pole piece means having a surface spaced from and forming a predetermined air gap with said armature when in said




normally closed state, said pole piece means having a chamber for receiving therein a minor portion of said range spring and a minor portion of said plug means,

solenoid means adapted to be energized for providing an electromagnetic attractive force between said armature and said pole piece means to move said armature thereby moving said plug means from said normally closed to said open state, and

means for adjusting said range spring to said preselected spring force to vary to a predetermined value the maximum value of said upstream force of fluid thereby to provide said relief function, a portion of said adjusting means being received within said chamber, said adjusting means and said range spring disposed on the downstream side of said orifice.

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**3,977,650**

## SWITCHING DEVICE

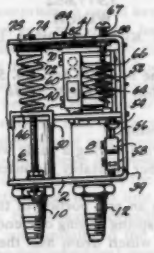
**Karl-Erik Berggren, Farsta, Sweden, assignor to A-Kyl i Farsta AB, Farsta, Sweden**

**Filed Jan. 20, 1975, Ser. No. 542,401**

**Claims priority, application Sweden, Jan. 18, 1974, 7400672; Sept. 27, 1974, 7412197**

**Int. Cl.² H01H *35/26***

**U.S. Cl. 251—129** **9 Claims**




1. In a pressure responsive switching device comprising two pressure inputs, a pressure responsive member connected to said respective inputs, each member actuating a movable contact element of a representative electric switch by means of a corresponding actuating member upon the occurance of a predetermined pressure at the respective pressure input, the improvement comprising a third electric switch with a movable contact element, said third switch being mounted for

movement with one of the actuating members so that when the other actuating member is moved away from the corresponding contact element actuating position said other actuating member meets the third switch for actuating the movable element thereof upon movement of the third switch caused by the movement of said one actuating member from the contact element acutating position thereof.

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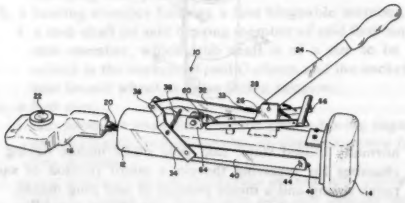
**3,977,651**

## DYNAMIC CARPET STRETCHER

**Charles Melvin Chamberlain, 1032 Ballard Place, Fort Myers, Fla. 33901**

**Filed Aug. 22, 1975, Ser. No. 606,940**
**Int. Cl.² A47G *27/04***
**U.S. Cl. 254—57** **17 Claims**



1. A carpet tightening device requiring little force to be delivered by the operator's knee, comprising an elongate housing having a knee pad mounted at its rear end, and a toothed carpet-engaging member movably mounted at its front end, said housing being substantially hollow and containing an elongate compression spring, an elongate handle means pivotally mounted in an upright position atop said housing, means connecting a portion of said handle with spring-contacting means, said handle normally being angled in a position slightly to the rear of a vertical position, and being movable by the operator in a forward direction therefrom, said handle, upon being moved in the forward direction, serving to bring about substantial compression of said spring, latch means serving to hold said spring in the compressed condition, and trigger means connected to bring about operation of said latch means so as to release the force of said spring at the behest of the user, said spring, upon being released, bringing about a forceful forward movement of said toothed means, away from said housing.

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**3,977,652**

## WINCH

**Floyd Mauch, 8245 Kirkwood Drive, Los Angeles, Calif. 90046**

**Filed June 5, 1975, Ser. No. 583,869**
**Int. Cl.² A63B *61/04***
**U.S. Cl. 254—164** **5 Claims**

1. A winch comprising:

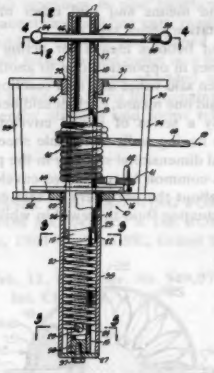
a tubular winch drum having a cable wound thereon,

a cylindrical member rotatably mounted within said winch drum,

a helical spring on an end portion of the cylindrical member, said helical spring having one end thereof coupled to rotate with the winch drum and the other end thereof coupled to rotate with the cylindrical member,

a support means for said winch drum including a brake cylinder, said helical spring normally having an outer diameter larger than the inner diameter of said brake cylinder, whereby when said winch drum is journaled on said support means with the helical spring on the end portion of the cylindrical member inserted in said brake cylinder the torsional force of the spring bearing against the inner wall of said brake cylinder prevents said winch from rotating on said support means to pay out said cable, and

means effective upon applying a turning action on said winch drum and cylidrical member in one angular direction to contract said spring and thereby enable said winch



drum to rotate on said support means to take up the cable, and upon applying a turning action on said winch drum and cylindrical member in the opposite angular direction to contract said spring and thereby enable said winch drum to rotate on said support means to pay out the cable.

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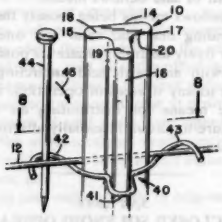
**3,977,653**

## POST AND CLIP CONSTRUCTION FOR THE WIRE FENCES

**Conrad F. Fingerson; Paul P. Durhman, both of Chatfield; James E. Gove, Rochester, and Daniel Meyer, Chatfield, all of Minn., assignors to AFC, Inc., Chatfield, Minn.**

**Filed June 27, 1974, Ser. No. 483,678**
**Int. Cl.² E04H *17/10***
**U.S. Cl. 256—10** **6 Claims**



1. Apparatus for supporting a fence wire, comprising:

an elongated post member having a flat side thereon with a web portion extending transversely thereto and defining a T-shaped cross-section; said post member adapted to contact said fence wire along said flat side with said fence wire extending generally transversely to said post member; and

a resilient wire-like clip having a central U-shaped portion sized to securely engage said web portion, with a pair of oppositely directed, outwardly extending wing portions which define wire-engaging hooks connected thereto and directed generally transversely of said post member on opposite sides thereof; said clip flexing in assembly with said hooks resiliently engaging said fence wire on opposite sides of said post member, whereby said U-shaped portion is flexed to securely engage said web portion.

3,977,654

## STANCHION

Geoffrey Etherington, Madison, and David Berggren, Old Lyme, both of Conn., assignors to Marine Fashion Inc., East Lyme, Conn.

Filed Aug. 25, 1975, Ser. No. 607,661
Int. Cl.² B01F 13/00
U.S. Cl. 256—59 3 Claims

1. A stanchion for mounting as one of a series on the surface of a boat deck or the like to cooperate for supporting a lifeline comprising, the combination of, a thin walled metal cylindrical tube of uniform internal diameter, a mounting bracket attached to the bottom end of said tube and adapted to be mounted upon said surface and to support said tube in a substantially vertical position, a solid cylinder of plastic which has been inserted into said tube from the bottom end thereof whereby said tube exerts hoop strength on said cylinder, said tube extending from the bottom end of said tube to beyond the center thereof, the diameter of said cylinder being such that it is snugly received within said tube and cooperates therewith to form a rigid construction whereby said solid cylinder prevents said tube from deviating from its true cylindrical condition and said tube provides tension strength longitudinally of the stanchion while exerting hoop strength around said solid cylinder, and a second cylinder of plastic of substantially the diameter of said first named cylinder and positioned within said tube at the top end thereof, said second cylinder having an end portion projecting from the end of said tube and presenting a convex end surface for the stanchion, said tube and said second cylinder having a diametric bore therethrough for the lifeline, said stanchion being strengthened by said rigid construction to withstand substantial bending stresses throughout the zone where such stresses are caused by horizontal forces on the stanchion and the lifeline.

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3,977,655

## LIQUID AGITATOR WITH VIBRATION SUPPRESSING STABILIZERS

Takashi Okabayashi, and Satoru Mikuni, both of Kobe, Japan, assignors to Sybron Corporation, Rochester, N.Y.

Filed Apr. 10, 1974, Ser. No. 459,705
Claims priority, application Japan, Apr. 21, 1973, 48-45446
Int. Cl.² B01F 7/18
U.S. Cl. 259—107 5 Claims

1. In apparatus for agitating a liquid comprising:

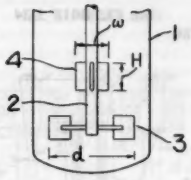
a vessel;

a rotary agitator comprising:

a centrally located rotary shaft having a first end and a second end, said first end being supported by said vessel, and

agitator blades attached to said second end; and

means for rotating said agitator about said shaft so that at least a portion of the liquid rotates about the shaft with a tangential velocity proportional to the distance from the shaft;




the improvement comprising a vibration suppressing stabilizer comprising a plurality of plates attached to said rotary shaft above and near to said agitator blades and located within said rotary portion of the liquid, said stabilizer having a span less than the agitator blade diameter but equal to between 20 to 25% of the blade diameter and a height of at least about 20% of the blade diameter.

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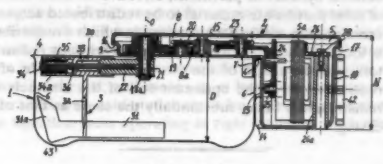
3,977,656

## DOMESTIC ELECTRIC ICE-CREAM FREEZER

André Faivre, Dijon, France, assignor to Seb S.A., Selongey, France

Filed Mar. 14, 1975, Ser. No. 558,454
Claims priority, application Luxemburg, May 2, 1974, 69979
Int. Cl.² B01F 7/18
U.S. Cl. 259—108 4 Claims



1. A domestic electric ice-cream freezer for use in a refrigerated enclosure, comprising a vessel having a cylindrical side wall and a reduction-gear motor unit having a shaft adapted to drive a paddle system, the reduction-gear motor unit resting on only a portion of the edge of the cylindrical side wall of the vessel in the operating position, the portion of said unit which contains the motor being located outside the vessel and being applied against the external face of the cylindrical side wall of said vessel, the portion of said unit containing the reduction-gearing extending partly above the vessel and having a projecting tongue bearing freely against the internal face of said side wall, the reduction-gear motor unit having two opposite ends that comprise two coaxial cylindrical portions whose radius corresponds substantially to the radius of the vessel, each of said two coaxial cylindrical portions having a shouldered projection in the vicinity of the top face of the reduction-gear motor unit, the height of said reduction-gear motor unit being substantially the depth of said vessel, and said reduction-gear motor unit being therefore arranged to fit inside the vessel when not in use, with the shouldered projections of the said cylindrical portions resting on the edge of the vessel.

3,977,657

## APPARATUS FOR MIXING PARTICULATE SOLIDS

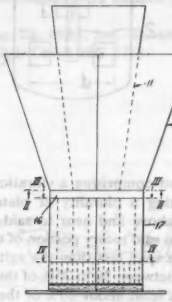
Charles John Shearer, Cambridge, and Charles Arthur Martin de Bartolome, Beauchief, both of England, assignors to Charles John Shearer, Cambridge, England

Filed June 17, 1974, Ser. No. 480,315

Claims priority, application United Kingdom, Oct. 23, 1973, 49345/73

Int. Cl.² B01F 5/24

U.S. Cl. 259—180 10 Claims



1. An apparatus for mixing particulate solid materials, by passing the materials through the apparatus, said apparatus comprising, in combination:

a. a hollow casing of polygonal cross-section;

b. at least one set of rectilinear partitions within the said casing extending parallel to the axis of the casing, the partitions of a set dividing the casing into a plurality of channels also of polygonal cross-section, arranged side by side in the casing; and

c. redistributors located in some, but not all, of the channels defined by a set of partitions, effective to allow the flow of solid particulate material to be redistributed across the cross-section within each channel in which a redistributor is located, the shape of the channels without redistributors and the shape of the passages on each side of the redistributors at the upstream end of the channels with redistributors being substantially the same as that of the casing.

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3,977,658

## APPARATUS FOR WORKING PLASTIC MATERIALS

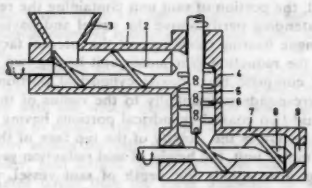
Ludwig Wittrock, Marl; Heinz Brand, Dorsten, and Helmut König, Bovenden u. Gottingen, all of Germany, assignors to Ludwig Wittrock, Marl, Germany

Filed Feb. 25, 1975, Ser. No. 552,933

Claims priority, application Germany, Feb. 25, 1974, 2408936

Int. Cl.² B29B 1/06

U.S. Cl. 259—192 2 Claims



1. Apparatus for working thermoplastic raw material and similar masses through rotating kneading tools, wherein the material to be worked is introduced into a driven transport apparatus, wherein the material is softened by means of the heat which is generated by the friction developed by the kneading and the softened material is thereafter compressed by a transporting element, so that it may be formed into parts, comprising

a. a separately controllable feeding device,

b. a separate controllable plasticizing means arranged after the device, the plasticizing means consisting of a kneading rotor provided with radial fingers, wherein the contact surface of the rotor (15), including the surface of the radial fingers (16) and the projection areas (19), is not more than 80% of the surface of the contacted inside wall (22) of the kneading housing (21), and

c. a separate controllable compression apparatus, wherein the compression apparatus is designed as a simple single worm gear which operates by means of a thread gradient, which gradient is larger than the worm gear diameter, is approximately 1.5 times larger, and has a thread thickness of at least 15/100 of the diameter.

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3,977,659

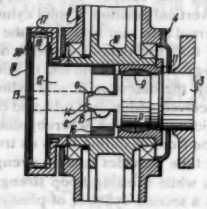
## CONVERTER

Fedor Vladimirovich Kraizinger, prospekt Metallurgov, 219, kv. 70; Alexei Ilich Zinsky, 27 kvartal, 13, kv.; Boris Fedorovich Getman, ulitsa Kavkazskaya, 6; Alexandr Semenovich Bruk, prospekt Lenina, 13, kv. 34; Sergei Sergeevich Eremenko, ulitsa Chernomorskaya, 20, kv. 47, all of Zhdanov Donetskoi oblasti; Alexei Ivanovich Malorov, Novo-Alexeevskaya ulitsa, 3a, kv. 27, and Vladimir Ivanovich Reshetov, Sayanskaya ulitsa, 11, kv. 374, both of Moscow, all of U.S.S.R.

Filed Apr. 24, 1975, Ser. No. 571,391

Int. Cl.² C21C 5/50

U.S. Cl. 266—245 11 Claims



1. A converter comprising: a trunnion ring with trunnions; a body secured in said trunnion ring; at least one multimotor drive mounted with a gear hub of a low-speed reducer on said ring trunnion; a bush arranged at an end of said trunnion of the side of said multimotor drive; a socket disposed in said gear hub of the low-speed reducer and adapted to be joined with said bush, whose external surface is adjusted in shape and size to fit the corresponding surface of the socket, through which said ring trunnion is coupled with said gear hub of the low-speed reducer by means of a flexible joint.

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3,977,660

## BLAST-FURNACE TUYERE HAVING EXCELLENT THERMAL SHOCK RESISTANCE AND HIGH DURABILITY

Hiroshi Nakahira, Nishinomiya, Japan, assignor to Toyo Calorizing Ind. Co., Ltd., Kobe, Japan

Filed Feb. 28, 1974, Ser. No. 447,003

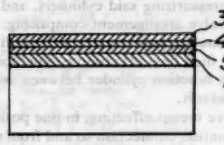
Int. Cl.² C21B 7/16

U.S. Cl. 266—265 11 Claims

1. A blast-furnace tuyere having excellent thermal shock resistance and high durability which consists essentially of a tuyere substrate composed of a member selected from the

group consisting of copper and copper alloy; a self-fluxing alloy metallized layer sprayed on the surface of said substrate, said alloy being selected from the group consisting of nickel-base alloy consisting essentially of 65–90% nickel, 10–35% chromium, 1.5–4.5% silicon and 1.5–4.5% boron, and a cobalt-base alloy consisting essentially of 40–60% cobalt, 19–21% chromium, 1.5–4.5% silicon, 1.5–4.5% boron and a small amount of nickel and tungsten; a cermet layer sprayed on the surface of said alloy metallized layer, said cermet being selected from the group consisting essentially of a mixture of zirconia or alumina, having a purity of more than 90%, with a nickel-chromium alloy consisting essentially of 65–90% nickel and 10–35% chromium, in a mixing ratio of 30:70–70:30, a mixture of zirconia or alumina, having a purity of more than 90%, with a nickel base alloy consisting essentially of 65–90% nickel, 10–35% chromium, 1.5–4.5% silicon and 1.5–4.5% boron, in a mixing ratio of 30:70–70:30, a cobalt-base alloy consisting essentially of 40–60% cobalt, 19–21% chromium, 1.5–4.5% silicon, 1.5–4.5% boron and a small amount of nickel and tungsten, in a mixing ratio of 30:70–70:30, and a mixture of zirconia or alumina, having a purity of more than 90%, with a nickel-aluminum alloy consisting essentially of 80–95% nickel and 20–5% aluminum, in a mixing ratio of 30:70–70:30; and a ceramic coating layer selected from the group consisting of zirconia and alumina sprayed on the surface of said cermet layer; all percentages being by weight.

**10.** A method of manufacturing a blast-furnace tuyere having excellent thermal shock resistance and high durability, which comprises roughening a surface of a tuyere substrate composed of a member selected from the group consisting of




copper and copper alloy; spraying a self-fluxing alloy on the surface of said substrate by means of a spraying device using plasma jet or oxy-acetylene flame as a heat source to form a self-fluxing alloy metallized layer, said alloy being selected from the group consisting of nickel-base alloy consisting essentially of 65–90% nickel, 10–35% chromium, 1.5–4.5% silicon and 1.5–4.5% boron, and a cobalt-base alloy consisting essentially of 40–60% cobalt, 19–21% chromium, 1.5–4.5% silicon, 1.5–4.5% boron and a small amount of nickel and tungsten; spraying a cermet powder on said self-fluxing alloy metallized layer by means of a spraying device using plasma jet or oxy-acetylene flame as a heat source to form a cermet layer said cermet being selected from the group consisting essentially of a mixture of zirconia or alumina, having a purity of more than 90%, with a nickel-chromium alloy consisting essentially of 65–90% nickel and 10–35% chromium, in a mixing ratio of 30:70–70:30, a mixture of zirconia or alumina, having a purity of more than 90%, with a nickel base alloy consisting essentially of 65–90% nickel, 10–35% chromium, 1.5–4.5% silicon and 1.5–4.5 % boron, in a mixing ratio of 30:70–70:30, a cobalt-base alloy consisting essentially of 40–60% cobalt, 19–21% chromium, 1.5–4.5% silicon, 1.5–4.5% boron and a small amount of nickel and tungsten, in a mixing ratio of 30:70–70:30, and a mixture of zirconia or alumina, having a purity of more than 90%, with a nickel-aluminum alloy consisting essentially of 80–95% nickel and 20–5% aluminum, in a mixing ratio of 30:70–70:30; and then spraying a member selected from the group consisting of zirconia and alumina having a purity of more than 90% on said cermet layer by means of a spraying device using plasma jet or oxy-acetylene flame as a heat source to form a ceramic coating layer; all percentages being by weight.

**3,977,661**

## INJECTION MOLD LOCKING DEVICE AND TURNTABLE

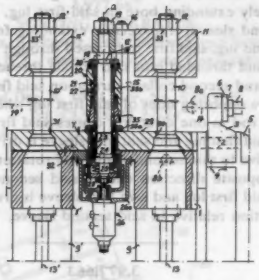
**Edwin Ruegg, Netstal, Switzerland, assignor to Maschinenfabrik u. Giesserei Netstal AG, Switzerland**

**Continuation of Ser. No. 476,949, June 6, 1974, abandoned. This application Jan. 14, 1976, Ser. No. 648,893**

**Claims priority, application Switzerland, June 13, 1973, 8566/73**

**Int. Cl.² B29F 1/00**

**U.S. Cl. 269—57** **9 Claims**



**1.** In an injection mold locking device of the type having at least one mold locking unit, including a stationary yoke and an opposed mobile yoke, associated with a turntable for transporting an open mold between first and second working stations, the improvement comprising, in combination, means mounting said turntable for rotation about an axis parallel to the direction of operation of said mold locking unit and between said stationary and mobile yokes, to extend between said working stations; driving means operable to rotate said turntable; a hydraulic pressure mechanism mounted to act coaxially of said turntable on that side of said turntable facing said mobile yoke and operable to selectively press said turntable against said stationary yoke; spring means mounted to act coaxially of said turntable in opposition to said hydraulic pressure mechanism and adapted to elevate said turntable from said stationary yoke when said hydraulic pressure mechanism is relieved; and means at at least one working station, associated with said stationary yoke, providing locations for two injection units operating at right angles to each other.

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**3,977,662**

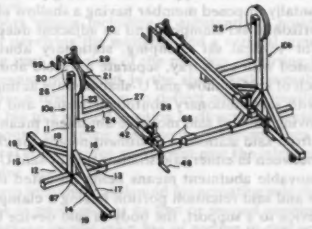
## FURNITURE UPHOLSTERY STAND

**Herbert B. Cook, 719 E. Southcross, San Antonio, Tex. 78214**

**Filed Aug. 25, 1975, Ser. No. 607,366**

**Int. Cl.² B25B 1/10**

**U.S. Cl. 269—60** **2 Claims**



**1.** A furniture upholstery stand comprising first and second coacting support members, each support member comprising a standard, said standard secured downwardly to a base, a first disc fixedly secured to said standard, a second disc rotatably mounted on said first disc, a transversely extending member

secured to said second disc, first and second coacting sleeves slidably mounted on each transversely extending member, means on said first and second sleeves adapted to secure said furniture to said stand, means to adjust said first sleeve relative to said second sleeve, and means to adjust said second sleeve and said first sleeve remotely connected thereto on said transversely extending member to balance the weight of said furniture on said stand, said means to adjust said first sleeve relative to said second sleeve comprising a first rod including first and second ends, said first rod provided with threads at least adjacent said second end, a first lug on said first sleeve, a transversely extending bore in said first lug, a second lug on said second sleeve, transversely extending female threads in said second lug, said first rod passed through said bore in said first lug and threaded into said female threads in said second lug, first and second collars carried on said first rod in spaced relation to opposing sides of said first lug whereby rotation of said first rod in one direction causes said first collar to bear against said first lug and said first sleeve is driven in one direction relative to said second sleeve and rotation of said first rod in the opposite direction causes said second collar to bear against said first lug and said first sleeve is driven in the opposite direction relative to said second sleeve.

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## 3,977,663
## SKI CLAMP

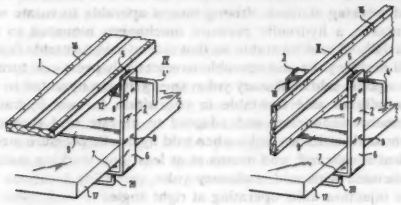
**Horst Köhler, Oberes Feld 13, 897 Immenstadt; Kurt Ess, Jahnstrasse 2, 8972 Sonthofen, and Max Luitz, Bihlerdorf 22, 8976 Blaichach, all of Germany**

**Filed May 19, 1975, Ser. No. 578,884**

**Claims priority, application Germany, May 21, 1974, 17695[U]; Apr. 14, 1975, 2516211**

**Int. Cl.² B25B *1/20***

**U.S. Cl. 269—153** **7 Claims**



**1. A clamping device for clamping a ski for working on its different surfaces comprising a bearing portion for selective mounting thereon of a ski in either a horizontal or vertical position and a retention portion for fastening said device to a work table or other support, said bearing portion including a horizontally disposed member having a shallow elongated tray for horizontal ski clamping and an adjacent deeper U-shaped tray for vertical ski clamping, stationary abutment means associated with each tray, separate movable abutment means for each of said shallow and U-shaped trays acting in cooperation with said stationary abutment means, and screw means for moving each of said movable abutment means toward and away from said stationary abutment means for clamping a ski therebetween in either said shallow tray or said U-shaped tray, said movable abutment means being mounted on said screw means and said retention portion having a clamp for securing the device to a support, the body of said device being formed of a vertical face member having an inturned flange at its lower end, and a U-shaped frame member joined at its free ends to said vertical face member to define a rectangular opening therebetween, said horizontally disposed member constituting the upper arm of said U-shaped member, said screw means being mounted in the bight portion of said U-shaped member thereby presenting no obstruction to the user.**

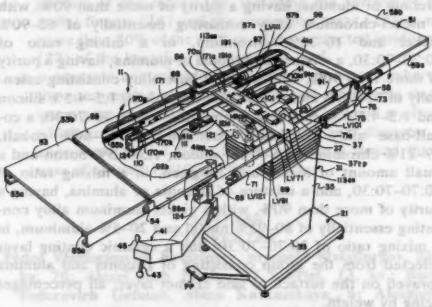
## 3,977,664
## HYDRAULIC CONTROL VALVE ARRANGEMENT FOR OPERATING TABLES AND THE LIKE

**Larry D. Mitchell, Ballwin, and Edward M. Mason, St. Louis, both of Mo., assignors to Affiliated Hospital Products, Inc., St. Louis, Mo.**

**Filed Mar. 25, 1975, Ser. No. 561,887**

**Int. Cl.² A61G *13/00***

**U.S. Cl. 269—325** **34 Claims**



**1. A hydraulic control valve arrangement for an operating table having a table top function-actuating cylinder for effecting a table top function and an elevate actuation cylinder for effecting elevation movement of the table top or the like and a pump for pressurizing said cylinders, and a fluid reservoir, said control valve arrangement comprising:**

**table top function valve means for selectively enabling and disabling fluid flow actuation connection to and from said table top function cylinder between said pump and said fluid reservoir,**

**elevate valve means effecting, in one position thereof, fluid flow actuation connection to and from said elevate cylinder between said pump and said reservoir, and effecting in said same one position overriding fluid flow actuation disconnection in the connection between said pump, said table top function cylinder and reservoir.**

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## 3,977,665
## CONTINUOUS BOOK-MAKING SYSTEM

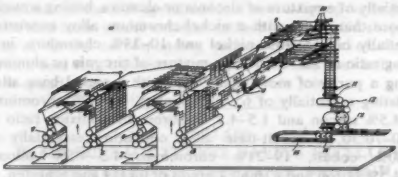
**Kenneth Albert Bowman; Royston Gilbert Breddy, and Royston John West, all of Bristol, England, assignors to Strachan & Henshaw Limited, Bristol, England**

**Filed July 17, 1974, Ser. No. 489,443**

**Claims priority, application United Kingdom, July 20, 1973, 34713/73; Oct. 16, 1973, 48203/73; Sept. 18, 1973, 43807/73; Nov. 20, 1973, 53749/73**

**Int. Cl.² B41F *13/58***

**U.S. Cl. 270—4** **9 Claims**



**1. A book making system for making a book with a predetermined number of pages, said system including at least one printing press, a slitter and a cutting and folding means, said system further including:**

**a feed means for continuously feeding material printed by said printing press to said slitter for slitting and to said cutting and folding means for cutting and folding, said cutting and folding means thereby producing successive identical batches of signatures each batch including all of**

the predetermined number of pages of said book half of said pages in one orientation and half of said pages in an opposite orientation, each batch further including a face portion and a back portion;

distributor means for dividing said batches of signatures into two separate streams;

conveyor means for receiving said two separate streams of batches from said distributor means, said conveyor means including means for imposing a rotation of 180° on said batches of one stream relative to the batches in the other stream; and,

said conveyor means further including collating means for paring a batch of signatures from one stream with a batch of signatures from the other stream thereby forming a set of batches with the face of the batch from one stream facing the back of the batch from the other stream; whereby the set just formed is prepared for come-and-go binding.

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3,977,666

## APPARATUS FOR SELECTIVELY FEEDING SHEETS FROM A PLURALITY OF CASSETTES

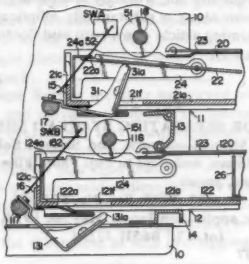
**Shigeru Suzuki, Yokohama; Kyoji Omi, and Tatsuo Tani, formerly Nishikawa, both of Tokyo, all of Japan, assignors to Ricoh Co., Ltd., Japan**

**Filed May 16, 1975, Ser. No. 578,264**

**Claims priority, application Japan, May 18, 1974, 49-55973**

**Int. Cl.² B65H *1/12, 3/44***

**U.S. Cl. 271—9** **8 Claims**



**1.** An apparatus for selectively feeding sheets from a plurality of cassettes each containing sheets of different respective sizes, with each cassette having therein a sheet receiving plate, for receiving a stack of sheets thereon, movable upwardly within the respective cassette, and with each cassette having an opening formed in its bottom wall for access to the sheet receiving plate from the exterior of the cassette, said apparatus comprising, in combination, support means operable to receive and support plural said cassettes one by one in a vertical array; respective feeding means operatively associated with each casette received in said support means for feeding sheets from a stack thereof loaded in the associated cassettes on the receiving plate thereof; all of said feeding means being activated simultaneously and deactivated simultaneously; respective pushing means operatively associated with each cassette received in said support means and movable between an operative position, in which the pushing means extends through such bottom opening of the associated cassette to engage the receiving plate thereof and lift the receiving plate to bring the stack of sheets thereon into operative relation with the associated feeding means, and a retracted position, in which the pushing means is disengaged from the associated cassette and the receiving plate thereof whereby, in the retracted position of each pushing means, the associated cassette may be withdrawn from and inserted into said support means; a single manual means movable selectively to plural preset positions equal in number to the number of cassettes received in said support means with each position corresponding to a selected cassette; and mechanical means mechanically connecting said single manual means to all of said pusher means and normally restraining said pusher means in their retracted positions; said mechanical means, responsive to movement of said single manual means to a selected one of said preset positions, moving the pusher means of the corresponding cassette to its operative position for effecting feeding of sheets from such corresponding cassette.

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3,977,667

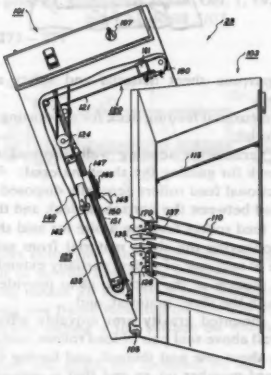
## SORTING APPARATUS

**Thomas R. Cross, Rochester, and Clifford Lloyd George, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 9, 1974, Ser. No. 530,905**

**Int. Cl.² B65H *31/24***

**U.S. Cl. 271—64** **2 Claims**



**1.** A sheet sorting apparatus comprising:

a frame,

a main bin supported on said frame,

a plurality of sorting bins supported on said frame adjacent to the main bin,

transport means for transporting copy sheets from a processor along a sheet path past the inlets of the plurality of sorting bins,

said transport means including a substantially horizontal conveyor overlying the main bin and a vertical conveyor extending past the inlets of the plurality of sorting bins,

deflector means positioned in the sheet path actuable to move from a first position to deflect sheets directly into the main bin to a second position to direct the sheets onto the horizontal conveyor past the main bin and then onto the vertical conveyor for movement past the inlets of said sorting bins, and

control means including a solenoid for actuating said deflector means to position it at its first or second positions to effect stacking in said main bin or sorting in said sorting bins, respectively at the option of a machine operator,

wherein said horizontal and vertical conveyors transport copy sheets under vacuum,

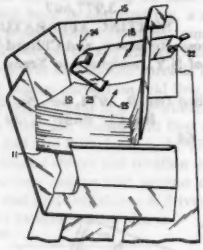
wherein said conveyors are pivotally mounted to pivot relative to said frame and bins.

3,977,668

## DUAL PURPOSE SHEET MATERIAL FEEDING AND SAFETY APPARATUS

Vincent P. Bologna, Norwalk, and Joseph E. McEvoy, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Sept. 26, 1975, Ser. No. 617,190
Int. Cl.² B65H *1/06*
U.S. Cl. 271—126 1 Claim



1. A dual purpose sheet material and safety apparatus, comprising:

a generally horizontal feeding deck for supporting a stack of sheet material;

a generally vertically extending wall disposed upon said feeding deck for guiding the sheet material;

a pair of frictional feed rollers generally disposed at a junction formed between the horizontal deck and the vertical wall, said feed rollers forming a bite for said sheet material for conveying the sheet material from said feeding deck, one of said pair of rollers partially extending above a surface portion of the deck so as to provide frictional contact with the sheet material; and

a pivotably mounted gravity arm movably affixed to the vertical wall above said pair of feed rollers, said arm being pivotable about one end thereof, and having a weighted safety guard member on an end that is opposite to said pivotable end, said gravity arm being pivotable so as to be able to raise said guard member above the stack of sheets, the weighted guard member then coming to rest upon an upper surface of said stack, said weighted guard member then applying a force upon the stack to urge sheets of said stack into frictional contact with said partially extending roller, said safety guard member having the additional function of gravitationally pivoting the arm to a lower position as the stack becomes depleted, the guard member eventually coming to rest adjacent said pair of rollers and covering the bite thereof, said guard member then acting as a protective safety guard against the inadvertent intrusion of an operator's fingers and clothing into the bite of the feed rollers.

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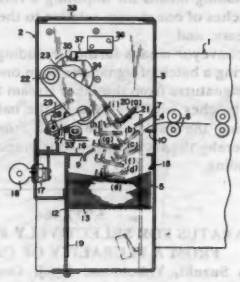
3,977,669

## STACKING APPARATUS FOR USE WITH PAPER SECURITY VALIDATION APPARATUS OR THE LIKE

Syugo Douno, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Japan

Filed May 19, 1975, Ser. No. 579,078
Claims priority, application Japan, May 21, 1974, 49-57044
Int. Cl.² B65H *31/34*
U.S. Cl. 271—180 4 Claims

1. An apparatus for stacking articles such as pieces of paper money as they are delivered one by one, comprising a casing having a horizontally extending slot for receiving the articles, partition means for defining a storage chamber within said casing and under said slot and including a floating bottom which is biased upwardly and on which the articles are to be stacked, guide means for forming a passageway slanting downwardly from said slot thereby to cause travel of each incoming article along said passageway, a pusher adjacent said passageway for pushing each incoming article downward, drive means for causing said pusher to move up and down, and holder means for holding each incoming article on said storage chamber, said drive means having a rotary actuator having an output shaft, a crank arm fixedly mounted at one end on said output shaft and rotatably connected at the other end to the top end of said pusher, and a swingable arm having a free end rotatably connected to said pusher at a point intermediate the top and bottom ends thereof, whereby said pusher is made to move up and down along a substantially elliptical path for pressing each incoming article down onto said floating bottom from said passageway.



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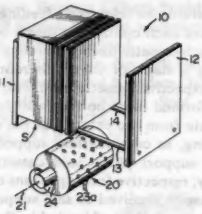
3,977,670

## DEVICE FOR SEPARATING STACKED SHEETS

Masao Tsuruta, Minami-ashigara, and Shigeki Sakate, Fujimiya, both of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 27, 1975, Ser. No. 581,096
Claims priority, application Japan, May 30, 1974, 49-61248
Int. Cl.² B65H *31/34*
U.S. Cl. 271—207 14 Claims



1. A device for separating sheets accumulated in a stack comprising in combination:

a sheet supporting holder means including a pair of end plates and a support member extending therebetween fixed thereto, said support member supporting said sheets on the edges thereof and being provided with at least one opening for allowing an air blow to pass therethrough and between said sheets, and

a rotary air blowing cylinder located under the sheet supporting holder means with the axis of rotation thereof oriented substantially parallel to said end plates, said rotary air blowing cylinder being provided with a number of air nozzles arranged regularly on the cylindrical face thereof.

3,977,671

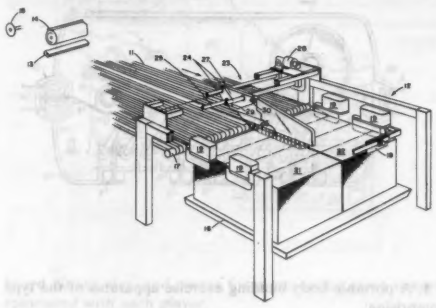
## METHOD AND APPARATUS FOR FORMING A PLURALITY OF EVEN-EDGED PILES OF FLEXIBLE SHEETS

Ruel E. Taylor, West Buxton, and Alston R. Wormwood, Gorham, both of Maine, assignors to Ruel E. Taylor, Inc., Gorham, Maine

Continuation-in-part of Ser. No. 403,055, Oct. 3, 1973, Pat. No. 3,923,299. This application Sept. 19, 1975, Ser. No. 615,064

Int. Cl.² B65H *31/38, 31/24*

U.S. Cl. 271—221 12 Claims



6. A center piler guide for use in guiding adjacent edges of piles of sheets formed by side-by-side delivery of edge adjacent sheets to the tops of said piles comprising:

a flat rigid plate the edge of which defines a smooth peripheral path;

an endless flexible member supported and guided on said edge and movable along said peripheral path;

a set of overlapping leaves supported on said endless member to project outwardly from said edge approximately in the plane of said rigid plate;

means for driving said endless member and said overlapping leaves carried thereby around said peripheral path; and

means for supporting said rigid plate without interferring with the movement of said overlapping leaves.

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3,977,672

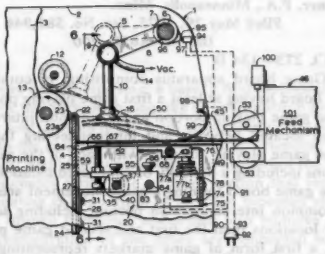
## AUXILIARY MECHANISM FOR LIFTING STOCK TO PRESS INTAKE

Edward S. Godlewski, 129 S. Spruce St., Wooddale, Ill. 60119

Filed Apr. 20, 1975, Ser. No. 572,882

Int. Cl.² B65H *5/00, 5/10*

U.S. Cl. 271—264 10 Claims




1. A mechanism for delivering stock items to a vacuum feed of the type having suction heads movable between pick-up and discharge positions for picking up an individual stock item from a support and discharging it to associated apparatus comprising:

lifting means;

means movably mounting said lifting means to move in a predetermined path for lifting the stock item from the support toward said suction heads;

means for actuating said lifting means attendant to said suction heads being disposed in pick-up position;

said lifting means comprising a flipper and means pivoting said flipper about a horizontal axis;

and said flipper comprising a plate-like element having a body portion, and a distal end portion inclined downwardly away from said body portion and forming a ridge therewith for engaging the stock item and draping it over said distal end portion, said distal end portion being located to press the stock item in alignment with said suction heads.

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3,977,673

## SHEET CONVEYOR MECHANISM

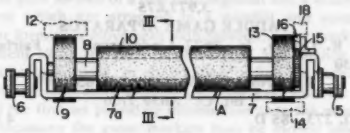
Yutaka Seto, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Japan

Filed Sept. 25, 1975, Ser. No. 617,299

Claims priority, application Japan, Oct. 1, 1974, 49-113632

Int. Cl.² B65H *5/02*

U.S. Cl. 271—277 2 Claims



1. A sheet conveying mechanism comprising

a. a pair of moving conveying members,

b. driving means for said conveying member,

c. at least one frame mounted on said conveying members, the frame having a flat surface on which a sheet is located,

d. at least one pinch roll mounted on said frame so as to substantially contact with said flat surface,

e. a first cam positioned at a position near the path of movement of said frame,

f. a second cam positioned at another position near said path, and

g. means for rotating said pinch roll by actuation of said first and second cams to grip and release the sheet.

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3,977,674

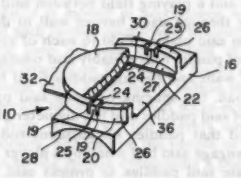
## HOLDER FOR A GOLF BALL MARKING PLATE

Henry O. Zeller, 2083 Five Mile Line Road, Penfield, N.Y. 14526

Filed Dec. 11, 1974, Ser. No. 531,805

Int. Cl.³ A63B *53/14*

U.S. Cl. 273—32 A 12 Claims



1. In a holder for a golf ball marking plate, the combination comprising:

a body member having a first recess on one side for receiving a marking plate, said first recess defining a planar surface lying in a first plane;

said body member having first and second walls on opposite sides of said first recess and substantially perpendicular to said planar surface, the corresponding end portions of said walls being spaced apart a distance less than the distance across the plate with at least one of said first and second walls having a flexible lip with a portion thereof projecting laterally from said one wall, said lip portion having a surface lying in a second plane on one side of and substantially parallel to said first plane and spaced from said first plane a distance slightly greater than the thickness of the plate, said lip portion further being spaced from the other of said first and second walls a distance slightly less than the distance across a corresponding part of the plate whereby the plate is releasably held in said first recess when forced therein past said lip portion; and

said body member further having a second recess on the opposite side extending the full length of said body member.

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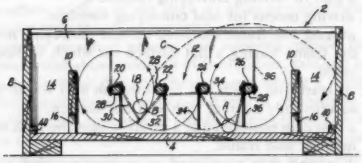
## 3,977,675
## PADDLE GAME APPARATUS

Henry R. Leuthy, Jr., 9672 Lindenbrook St., Fairfax, Va. 22030

Filed Nov. 13, 1975, Ser. No. 631,687
Int. Cl.² A63F 7/06
U.S. Cl. 273—85 D 4 Claims



1. Game apparatus comprising:

means defining a playing area and having upstanding opposed side walls and end walls defining the perimeter thereof;

barrier walls extending between said side walls adjacent but spaced from each of said end walls and being of less height than said side and end walls to define an upwardly open goal area between each barrier wall and its adjacent end wall and a playing field between said barrier walls;

an opening through each barrier wall to define a scoring path from said playing field to each of said goal areas;

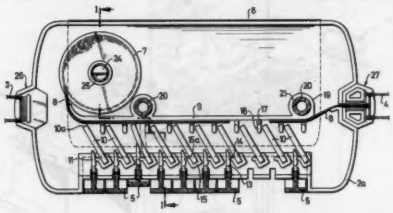
a plurality of paddle rods slidably and rotatably mounted in said side walls and having paddles fixed thereon; and

a playing ball, the spacing between said paddle rods, the lengths of said paddles and the diameter of said ball being so related that paddles on adjacent rods may simultaneously engage said ball whereby a player may selectively manipulate said paddles to project said ball along said playing field through an opening in a barrier wall to a goal area or manipulate adjacent paddles to lift said ball from said playing field and project the same over a barrier wall into a goal area.

## 3,977,676
## PORTABLE FRICTION TYPE EXERCISING APPARATUS

Werner Geisselbrecht, Spinozastrasse 6, 3000 Hannover, Germany

Filed May 19, 1975, Ser. No. 578,841
Claims priority, application Germany, May 22, 1974, 24249658
Int. Cl.² A63B 21/02
U.S. Cl. 272—131 14 Claims



1. A portable body building exercise apparatus of the type comprising:

a spool and an elongate elment wound on said spool,

casing means housing said spool,

fixed gripping means fixed on said casing means

movable gripping means connected at the free end of sail elongate element, whereby a user can grasp said casing means by means of said fixed gripping means and the free end of said elongate element by means of said movable gripping means to draw said elongate element off said spool in performing body building exercises,

resisting means for resisting the withdrawal of said elongate element from said spool, said resisting means comprising a plurality of brake elements mounted on said casing means, and each being movable between a first position spaced from said elongate element and a second position in contact with said elongate element, and

means for selectively moving said individual brake elements between said first and second positions thereof whereby to determine the number of brake elements in contact with said elongate element and thus the resistance to withdrawal of said elongate element from said spool.

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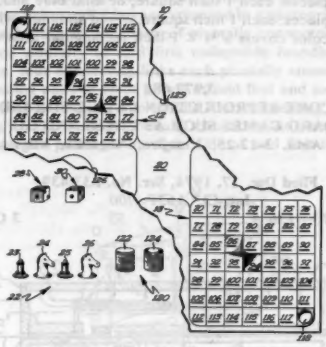
## 3,977,677
## BOARD GAME APPARATUS

David L. Magiera, Bloomington, Minn., assignor to Wicks & Nemer, P.A., Minneapolis, Minn.

Filed May 29, 1975, Ser. No. 581,946
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 D 12 Claims

1. Game board apparatus comprising, in combination: a game board having at least a first game playing portion and a second game playing portion and a common interconnection portion located between and interconnecting the first and second game playing portions, with each of the game playing portions including a plurality of connected locations arranged on the game board forming a game movement area, and with the common interconnection portion including substantially fewer locations than the first and second game playing portions; a first form of game markers representing individual players for movement around the locations only within the game playing portion associated with the associated player; a second form of game markers representing the individual players for movement around the locations within the first and second game playing portions and the common interconnection portion; chance taking apparatus for determining the

movement of the game markers within the first and second game portions and the interconnection portion on the game



board during play; and means for representing game rewards associated with each player.

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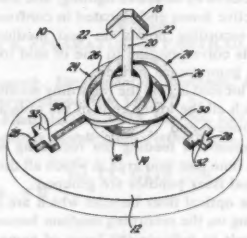
3,977,678

## RING TOSS APPARATUS USING BIOLOGICAL SYMBOLS

Martha T. Hedberg, 2330 Rochester Road, Apt. 205, Royal Oak, Mich. 48073

Filed July 14, 1975, Ser. No. 595,633
Int. Cl.[2] A63B 71/02
U.S. Cl. 273—100 8 Claims



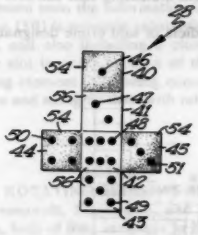
1. A novelty item comprising: a base, a first biological symbol of one sex that includes a ring-like circular portion secured to the base and also includes a sex indicating configuration connected to the circular portion thereof and extending away from the base; and at least one biological symbol of the other sex which includes a ring-like circular portion that receives the sex indicating configuration of the base mounted symbol upon being thrown thereover and which also includes a sex indicating configuration of the other sex connected to and extending away from the circular portion thereof, one of said sex indicating configurations being an arrow configuration having a shaft projecting outwardly from the associated circular portion and an arrowhead on said shaft so as to indicate the male gender, and the other sex indicating configuration being a cross configuration having a shaft projecting outwardly from the associated circular portion and a pair of cross bars so as to indicate the female gender.

3,977,679

## BOARD GAME APPARATUS

David L. Magiera, Hopkins, Minn., assignor to Wicks & Nemer, P.A., Minneapolis, Minn.

Filed Feb. 18, 1975, Ser. No. 550,379
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—134 D 10 Claims



1. Board game apparatus comprising, in combination: a game board having locations arranged thereon forming a path, with the path formed of a first path segment and a second path segment which are arranged in a parallel and contiguous manner forming a movement path thereon; game markers for movement along the path on the board; and chance taking apparatus comprising, in conbination: a first set including a plurality of separately identifiable members, with the members of the first set providing information as to the number of game locations the game markers may be moved along the path; a second set including at least two separately identifiable members which are further separately identifiable from the members of the first set; a third set including members formed from the combination of a member of the first set and a member of the second set; a fourth set including members formed from the combination of a member of the first set and a member of the second set, with the third set and the fourth set having no members in common; first means for randomly choosing a member of the third set; and second means for randomly choosing a member of the fourth set.

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3,977,680

## BOARD GAME APPARATUS INVOLVING CRIMINAL JUSTICE

Matt P. Lavine, 10803 Pleasant Acres Drive, Adelphi, Md. 20783

Filed Jan. 15, 1976, Ser. No. 649,398
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—134 C 4 Claims

1. A game for imparting an understanding of criminal justice proceedings and the importance of the selection of jurors to a criminal defendant comprising:

a. a game board having an elongate path thereon for movement of game pieces therealong comprising a plurality of spaces, including a start space at one end and a terminal space at the other end, at least some of said spaces including indicia awarding points to or removing points from a player whose game piece lands on one of said spaces, as the game piece is moved in accordance with a chance device, said path further comprising a verdict square and an alternate loop jail path originating at said verdict square to be entered on by a player found guilty,

b. a set of people cards each having indicia thereon representing a person having individual socio-economic characteristics from which set the players each randomly select his idenity, and choose the people of his jury, said set of cards having indicia designating a plurality of subsets thereof,

c. a crime designating card having indicia thereon,

i. corresponding to the said indicia designating said subsets of said people cards.

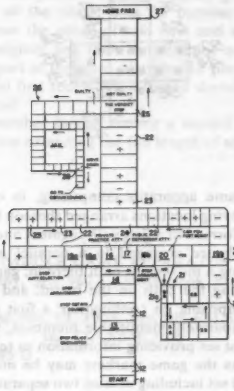
ii. a plurality of crime designations for each of said subset designations, and

iii. each crime for each sub-set designation corresponding to an indicia on a chance device, whereby by operation of the chance device a player having a given identity as a member of a socio-economic sub-set is charged with a particular crime,

d. a jury selection point card having indicia thereon corresponding to,

i. the said indicia indicating said sub-sets of said people cards,

ii. the crime indicia of said crime designating card, and



iii. indicia for awarding points to or substracting points from the player in accordance with the characteristics of the jury he has selected as related to his own identity, whereby said points are added to the points accumulated by the player during the movement of his game piece along the game board path, a predetermined point total determining whether the player is guilty and enters the alternate loop jail path or is not guilty and proceeds to the terminal space,

e. the game pieces each sized to be placed upon and within a space of said path of said game board, and

f. a chance device.

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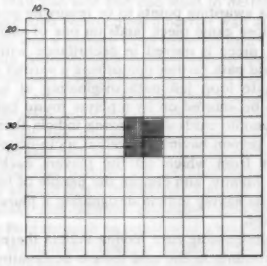
**3,977,681**

## GAME USING A BOARD AND PLAYING PIECES

**Jerry D. Deitrich, Rochester, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.**

**Filed Apr. 24, 1975, Ser. No. 571,226**
**Int. Cl.² A63F *3/00***
**U.S. Cl. 273—135 AC** **5 Claims**



**1. A game, comprising;**

a board, comprising 144 squares, each 1 inch square, forming a 12 × 12 square array,

a playing base formed on the board by coloring the center most four squares alternately red and blue,

playing pieces, each 1 inch square, of solid red,

playing pieces, each 1 inch square, of solid blue and,

playing pieces, each 1 inch square, of red and blue, wherein each color covers a ½ × 1 inch rectangular area of the piece.

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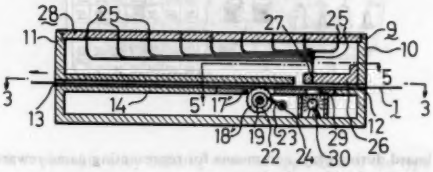
**3,977,682**

## GAME SCORE REPRODUCTION DEVICE FOR INDOOR BOARD GAMES SUCH AS CHESS AND GO

**Seizaburo Aida, 3-12-25, Kesajiro, Nagaoka, Niigata 940, Japan**

**Filed Dec. 17, 1974, Ser. No. 533,439**
**Int. Cl.² A63F *3/00***
**U.S. Cl. 273—136 A** **3 Claims**



**1. A game score reproduction device comprising a housing with a board member adapted to receive selective game pieces, the board member having recorded on its surface a predetermined game pattern;**

a display section positioned adjacent the game pattern;

a recording medium divided into a plurality of unit sections each having an identical area, on which a continuous record of game score is recorded one unit section after another in a form that allows optical reading;

a plurality of optical fiber bundles all having their respective top ends located in the game board surface where these top ends can serve to indicate the types and motions of said game pieces by selective lighting, and also all having their respective lower ends located in confrontation with respective recording points on said medium, each of which points corresponding to one of said top end locations in the game board surface;

a light source located across the recording medium from the area in which all the lower ends of the optical fiber bundles are grouped, and

a feed mechanism for feeding the recording medium one section at a time past said area in which all the lower ends of the optical fiber bundles are grouped,

whereby those optical fiber bundles which are specified by the recording on the recording medium become bright at their top ends to indicate the types of game pieces and their motions, and

wherein said recording medium has recorded thereon the types and motions of game pieces such as chessmen in a game score by specifying the ranks and files in which intended squares belong, and indicators in the display section; and the top ends of said plurality of optical fiber bundles serve to indicate the ranks and files, and indicators in the display section.

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**3,977,683**

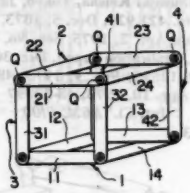
## PUZZLE RING

**Hiroshi Tomura, Tokyo, Japan, assignor to Aoki Ltd., Japan**

**Filed Dec. 30, 1974, Ser. No. 537,426**
**Claims priority, application Japan, May 18, 1974, 49-55018**
**Int. Cl.² A63F *9/08***
**U.S. Cl. 273—155** **2 Claims**

**1. A toy puzzle comprising, a first collapsible four-link parallel linkage arranged in a pantograph configuration having all links thereof pivotal, the four links having pivot points at opposite end portions thereof, means pivotally connecting**

said four links at said pivot points, a first of the four links having a second link and a third link pivotally connected thereto on a same inner side of opposite end portions thereof and a fourth link opposite said first link having said second link and said third link pivotally connected thereto on a same outer side of opposite end portions thereof, a second collapsible four-link parallel linkage arranged in a pantograph configuration having all links thereof pivotally connected and constructed similarly to said first collapsible four-link parallel linkage, four connecting links each pivotally connecting corresponding pairs of pivot points of said first and second four-link parallel linkages, two of said four connecting links each having an end portion pivotally connected at a separate one of said pivot points on an outer side of said first link of said




first four-link parallel linkage and each having an opposite end portion pivotally connected at one of separate points on an inner side of the first link of the second four-link parallel linkage and inwardly of links connected thereto, two others of said four connecting links each having an end portion pivotally connected at a separate one of said pivot points on an inner side of the fourth link of said first four-link parallel linkage and each having an opposite end pivotally connected at a separate one of the pivot points on an outer side of the corresponding fourth link of the second four-link parallel linkage outwardly of links pivotally connected thereto, and all of said links having a same length and each being elongated, flat and flexible for deformation thereof arcuately along the length and thickness dimensions thereof.

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**3,977,684**

## PLAYBACK APPARATUS, IN PARTICULAR A VIDEO PLAYER

**Eduard Camerik, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 20, 1975, Ser. No. 624,120**

**Claims priority, application Netherlands, Aug. 28, 1975, 7510150**

**Int. Cl.² G11B 7/00**

**U.S. Cl. 274—5 R** **3 Claims**

**1. A playback apparatus, in particular a video player (1), for playing back a round disk (6), which is provided with information tracks which are optically readable with the aid of a read beam obtained from a radiation source, in particular a laser, and comprising**

**a housing (2) with a substantially flat covering plate (3) in which a slot (13) is formed,**

**a motor-driven drive spindle (12) which projects from the housing for rotating the disk (6) parallel to and above the covering plate (3),**

**an optical focussing device (10), which is radially movable relative to the drive spindle in the housing and substantially underneath the covering plate (3), for projecting the read beam onto the information tracks, which focussing device (10) is movable substantially underneath the slot (13), and also including a closing element which closes the slot in every position of the focussing device said closing element (17) being connected to the focussing device and movable therewith relative to the housing (2).**

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**3,977,685**

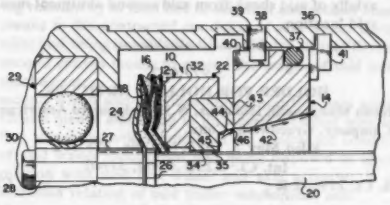
## ROTATING BELLOWS SEAL

**Robert G. Greenawalt, Barrington, and Edward J. Swann, Charlestown, both of R.I., assignors to EG&G, Inc., Wellesley, Mass.**

**Filed Nov. 5, 1974, Ser. No. 521,082**

**Int. Cl.² F16J 15/36**

**U.S. Cl. 277—89** **16 Claims**




**1. A rotating bellows seal comprising an annular bellows core having at one end a single annular end plate for directly drivingly and sealingly attaching said core to a shaft for rotation therewith, a bellows seal ring mounted on the other end of said core, the bellows seal ring including an annular metal member attached to the core and an annular seal face mounted on the metal member, the seal face being formed of a nonmetallic material, the inside diameter of the metal member being larger than the diameter of the inside diametral surface of the seal face, said bellows core being adapted to apply an axial force to sealingly engage said bellows seal face against said mating seal ring, the inside diameter of the mating seal ring at its juncture with said seal face being at least as great as the inside diameter of said seal face at its juncture with said mating seal ring, the inside diameter of the mating seal ring being larger than the diameter of the inside diametral surface of the seal ring for providing a flow path to carry away any leakage fluid from said bellows seal face.**

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**3,977,686**

## SELF-EJECTING CHUCK KEY FOR GEAR CHUCK

**James R. Buck, Ross Township, Kalamazoo County, Mich., assignor to Buck Tool Company, Kalamazoo, Mich.**

**Filed Oct. 24, 1974, Ser. No. 517,738**

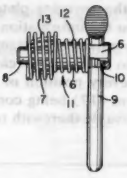
**Int. Cl.² B25B 13/44**

**U.S. Cl. 279—1 K** **19 Claims**

**1. In a self-ejecting key for a gear chuck, said key having an elongated shank with a bevel gear at one end thereof and a handle spaced from said bevel gear and positioned adjacent the other end of said shank, and means providing axially spaced first and second abutment means on said shank and projecting radially with respect thereto, said first and second abutment means being disposed between said handle and said bevel gear, said first abutment means being disposed more closely adjacent said handle and said second abutment means**

being disposed more closely adjacent said bevel gear, the improvement comprising:

resilient means mounted on said shank and extending axially thereof from said first abutment means to a location disposed beyond the large end of said bevel gear for permitting self-ejecting of said key from a gear chuck;



said resilient means having a first resilient portion positioned radially outwardly of said shank and extending axially thereof, said first resilient portion being received between and engaged with said first and second abutment means; and

said resilient means having a second resilient portion positioned radially outwardly of said bevel gear and extending axially of said shank from said second abutment means to said location.

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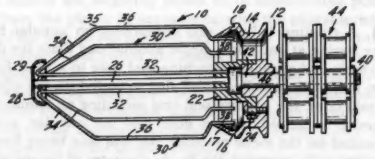
3,977,687

## HOLDER FOR HOLLOW ARTICLES

Alfredo Manganelli, Hohokus, N.J., assignor to American Can Company, Greenwich, Conn.

Filed May 7, 1975, Ser. No. 575,372
Int. Cl.² B23B *31/00, 31/40*
U.S. Cl. 279—2 R 14 Claims



1. A holder for supporting a hollow article having an open end, comprising:

a base;

a plurality of fingers extending outwardly from said base and disposed about a common axis therewith, each of said fingers having a first element secured to said base and extending outwardly therefrom, a second element commencing adjacent the outer end of said first element and extending away from said axis and generally toward said base, and a third element commencing adjacent the inner end of said second element and also extending toward said base and having a free inner end portion, said first and third elements extending generally parallel to said axis in the normal position of said fingers, with at least a portion of said first elements being resiliently deflectable relative to said base to permit movement of said fingers from said normal position thereof toward said common axis with the application of relatively slight force thereupon, and said third elements being resiliently deflectable relative to said first elements associated therewith, with the application of relatively slight force thereupon to permit further movement thereof toward said common axis, said fingers thereby cooperatively permitting loading of an article at an acute angle to said common axis, and the resilient characteristic of said elements thereof tending to cause said fingers to assume substantially said normal position after loading of the article, thereby cooperatively securely seating the mounted article thereon with said third elements bearing upon the inner surface of the article; and

restraining means extending outwardly from said base and normally engaging the free inner end portions of said third elements therebehind, to thereby substantially maintain said normal position of said fingers relative to said base in the absence of a mounted article.

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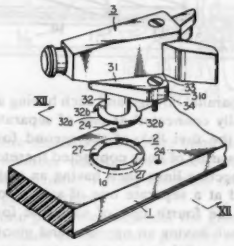
3,977,688

## STRUCTURE FOR CONNECTING A SKI BINDING CLAMP TO A SKI

Katsuhiko Imagawa, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 421.929, Dec. 5, 1073, abandoned. This application Apr. 2, 1975, Ser. No. 564,627
Claims priority, application Japan, Dec. 30, 1972, 48-1767; Jan. 31, 1973, 48-12592; Feb. 9, 1973, 48-15718; Feb. 15, 1973, 48-18678; Apr. 10, 1973, 48-39997
Int. Cl.² A63C *9/00*
U.S. Cl. 280—633 10 Claims



1. An apparatus for connecting a ski-binding clamp to a ski comprising:

a base plate attached to the bottom of said ski-binding clamp;

engaging means connected to said base plate and extending downward therefrom for engaging with said ski; and

bracket means embedded in the upper surface of said ski removably surrounding said engaging means for locking said engaging means to said ski when said base plate is rotated horizontally relative to the surface of the ski and of said bracket means and means on the ski and the base plate to prevent rotation of the base plate to thereby maintain the clamp in a fixed position on the ski.

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3,977,689

## NESTABLE CART

Ronald L. Rosa, Eagan, Minn., assignor to The Cornelius Company, St. Louis Park, Minn.

Filed Feb. 25, 1975, Ser. No. 552,983
Int. Cl.² B62B *1/12, 1/00*
U.S. Cl. 280—33.99 H 16 Claims

1. A nestable merchandise cart comprising:

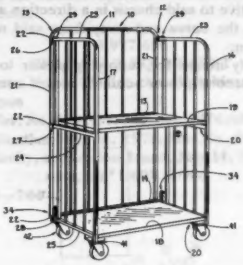
a. an upright rear frame of generally rectangular shape;

b. a pair of vertical side frames disposed at the front of the rear frame and respectively connected by vertical axis hinges to opposite side portions of the rear frame, the side frames being pivotable about a respective vertical axis from a normal position generally perpendicular to the rear frame to a nesting position forming an opening acutely divergent from the rear frame;

c. a shelf, connected by a horizontal axis hinge to one of the frames, and pivotable between a normally horizontal load carrying position between the side frames and a vertical storage position generally parallel and adjacent to the one frame;

d. means engageably operable between the shelf and the side frames for locking the side frames generally perpendicular to the rear frame when the shelf is in the horizontal position; and

e. means affixed on the rear and side frames and operable for limiting outward pivotal movement of the side frames



to the nesting position, the limit means for each side frame comprising

1. a pin mounted on one of the side and rear frames, and
2. a pin stop mounted on the other of the side and rear frames, the pin and pin stop being positioned for abutting against each other when the respective side frame is in the nesting position.

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**3,977,690**

**TRAILER, PARTICULARLY FOR TRANSPORTING AND LAUNCHING BOATS**

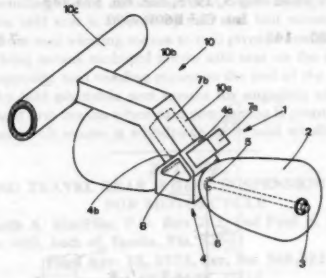
**Patrick Carn, Route de Benodet, 29000 Quimper, France**

**Filed Jan. 3, 1975, Ser. No. 538,306**

**Claims priority, application France, Jan. 9, 1974, 74.00643**

**Int. Cl.² B60P *3/10***

**U.S. Cl. 280—47.13 B** **14 Claims**



1. A transport and launching trailer comprising:

a pair of wheels carried by an axle;

a pair of adjustable load-bearing arms; and

a rigid, unitary core supporting both said axle and said arms, and occupying the space between said wheels, the core having convergingly sloping upper surfaces, each said surface having a protruding boss adapted to be slideably engaged by a mating protrusion from one of said load-bearing arms.

**3,977,691**

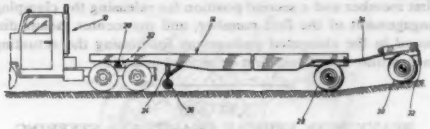
**EXTENDABLE AND FLEXIBLE TRAILER MECHANISM**

**Paul E. Robertson, 1129 Grimmet Drive, Shreveport, La. 71107**

**Filed Jan. 10, 1975, Ser. No. 540,284**

**Int. Cl.² B62D *21/14***

**U.S. Cl. 280—81 R** **17 Claims**



1. An extensible trailer mechanism adapted to be towed on a roadway by a tractor vehicle, said trailer mechanism comprising:

first chassis means;

a first wheel and axle assembly supporting said first chassis means;

second chassis means;

extension means engaging said first and second chassis means, said extension means being receivable in telescoping relation by at least one of said first and second chassis means in the contracted condition of said trailer mechanism and being extendable from said one of said first and second chassis means to extend the length of said trailer mechanism;

a second wheel and axle assembly supporting said second chassis means and being in juxtaposed relation with said first wheel and axle assembly in the contracted condition of said trailer mechanism and being disposed in spaced relation with said first wheel and axle assembly in the extended relation of said trailer mechanism; and

said extension means being flexible and securing said second chassis means in only a generally vertically movable relation to said first chassis means in the extended condition of said trailer mechanism.

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**3,977,692**

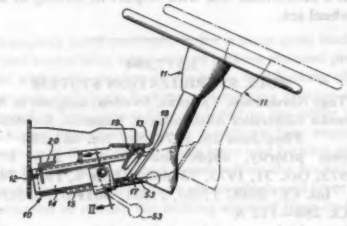
**EXTENSIBLE SUPPORT STRUCTURE**

**Samuel A. Findley, and Francis C. Rieger, both of Bronson, Mich., assignors to The Scott & Fetzer Company, Bronson, Mich.**

**Filed Mar. 20, 1975, Ser. No. 560,395**

**Int. Cl.² A45C *13/02*; B62D *1/18***

**U.S. Cl. 280—87 HA** **19 Claims**



1. An extensible support structure for supporting a device in adjustable positions relative to a structural member, said support structure comprising an elongated housing and means for attaching the housing to the structural member, said housing having at least one inner surface defining an elongated passageway having a wall surface with at least one discontinuity extending the length of the passageway so that the cross section of the passageway can be contracted and expanded, a first elongated member telescopically received in the elon-

gated passageway and being free to assume an infinite number of axial positions in the elongated passageway with respect to the housing, said first member having one end extending from the passageway and adapted for attachment to the device, actuating means movable between a first position for contracting the cross section of the passageway to force the wall surface forming the passageway into clamping engagement on the first member and a second position for releasing the clamping engagement of the first member, and overcenter means disposed in the elongated passageway for biasing the actuating means into either said first or second position.

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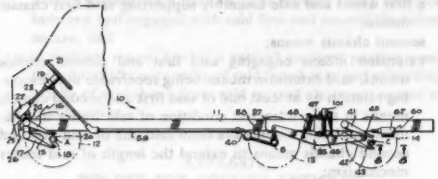
**3,977,693**

## HEAVY DUTY VEHICLE CHASSIS AND STEERING MECHANISM THEREFOR

**Roger L. Gamaunt, P.O. Box 55, Fawnskin, Calif. 92333**

**Filed Dec. 30, 1974, Ser. No. 537,184**
**Int. Cl.² B62A *61/10, 3/02***
**U.S. Cl. 280—91** **16 Claims**



1. A vehicle comprising:
a rigid chassis;
a front wheel set;
a pivotal means on the central longitudinal axis of said chassis coupling said front wheel set to one end of said chassis allowing rotation of said front wheel set about said axis;
a front steering mechanism for steering said front wheel set mounted on said front wheel set for pivotal movement therewith about said pivotal means, whereby said pivotal means allows directional rotation of said front wheel set without changing the geometry of said front steering mechanism;
a rear wheel set;
a pair of resilient means on opposite sides of said chassis, respectively, mounting said rear wheel set on the other end of said chassis; and
a progressive rear steering mechanism connected to said front steering mechanism for turning said rear wheel set at a differential rate with respect to turning of said front wheel set.

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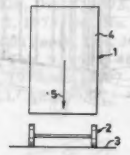
**3,977,694**

## ROLL STABILIZATION SYSTEM

**Karl Tage Nordstrom, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden**

**Filed June 20, 1974, Ser. No. 481,380**
**Claims priority, application Sweden, July 17, 1973, 7309973; Oct. 31, 1973, 7314809; June 4, 1974, 7407283**
**Int. Cl.² B60G *11/00, 21/06;* B61F *5/16, 5/24***
**U.S. Cl. 280—112 A** **7 Claims**

1. In a vehicle comprising a wheeled chassis arranged to ride upon a support surface, a body movably mounted on the chassis and being operable to carry passengers and goods, said vehicle body being normally situated in a neutral lateral orientation relative to said chassis during generally straight ahead travel of said vehicle, force detecting means for detecting and being activated by outwardly directed forces acting on the vehicle as the vehicle passes through a curve, and means operably connected to said force detecting means for displacing said body relative to said chassis in response to said vehicle passing through said curve, the improvement wherein said body displacing means comprises:
first power actuable means operably connected between said body and said chassis for tilting said body relative to said chassis such that the outer portion of said body facing away from the center of the curve is elevated relative to the inner portion of said body facing toward the center of the curve;
second power actuable means operably connected between said body and said chassis for laterally displacing said body relative to said chassis in a direction away from the center of the curve and away from said neutral lateral orientation;
power supply means for supplying power to actuate said first and second power actuable means comprising:



power source means;
first power transmitting means operably connecting said power source means to said first power actuable means to transmit power therebetween;
second power transmitting means operably connecting said power source means with said second power actuable means such that power is supplied to said second power actuable means separately from power supplied to said first power actuable means; and
means interconnecting said power supply means and said force detecting means for actuating said first and second power actuable means in response to said vehicle passing through a curve.

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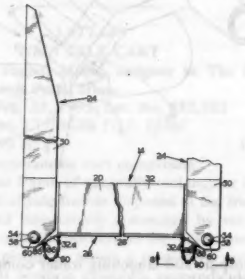
**3,977,695**

## LOG BUNK WITH RELEASABLE STAKES HAVING A POSITIVE, REMOTELY OPERATED LATCHING MECHANISM

**Dennis Ray Hassell, 250 Dead Indian Road, P.O. Box 219, Ashland, Oreg. 97520**

**Filed May 5, 1975, Ser. No. 574,743**
**Int. Cl.² B60P *7/00***
**U.S. Cl. 280—145** **7 Claims**



1. A log bunk comprising a frame adapted for pivotable mounting transversely of the vehicle, a stake, pivot means securing the lower end of the stake to an end of the frame for angular movement between raised and lowered positions, a stake latching dog pivotably mounted on said end of the frame, movable between latched and unlatched positions with respect to the stake, latching dog linkage means connected

pivotally at one end to the stake latching dog for moving the stake latching dog to either the latched or unlatched position, first latching dog operation means connected pivotally to the opposite end of the linkage means and pivotably mounted on said end of the frame for operation of the latching dog linkage means from a station adjacent the stake, and second latching dog operation means pivotably mounted on the opposite end of the frame for remote operation of the first latching dog operating means.

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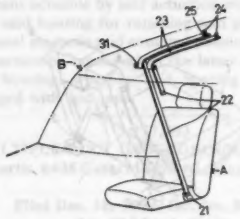
3,977,696

## SEAT BELT EQUIPMENT

Harutoshi Igeta, No. 1518, Kre-cho, Higashisumiyoshi, Osaka, Osaka, Japan

Division of Ser. No. 484,333, June 28, 1974, abandoned. This application Feb. 26, 1975, Ser. No. 553,218
Claims priority, application Japan, July 11, 1973, 48-83584
Int. Cl.² B60R 21/00
U.S. Cl. 280—744 3 Claims




1. A seat belt device for use with a seat, said device comprising:

seat belt means;

seat belt winding means at the lower side of said seat and connected to one end of said seat belt means for retracting said seat belt means thereinto;

rotatable arm means pivotably mounted at one end thereof above said seat and said winding means, extending forward therefrom, and connected at the forward end to the end of said seat belt means opposite the end of said seat belt means connected to said winding means for pivotably rotating and withdrawing said seat belt means from said winding means across said seat, whereby a person seated on said seat is crossed by said seat belt means extending from said winding means to said pivoted arm means; and

locking means mounted above said seat on the side thereof opposite said winding means at the end of the arc defined by said pivotable arm means for engaging and securing said arm means when said arm means is pivoted and said seat belt means is withdrawn from said winding means.

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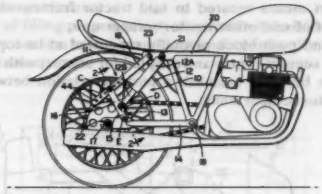
3,977,697

## LONG TRAVEL REAR WHEEL SUSPENSION SYSTEM FOR MOTORCYCLE

Kenneth A. MacPike, P.O. Box 203, and Paul E. Pence, P.O. Box 402, both of, Destin, Fla. 32541

Filed Apr. 15, 1975, Ser. No. 568,322
Int. Cl.² B62K 25/10
U.S. Cl. 280—284 10 Claims

1. A leverage assembly for a resilient rear wheel suspension system of a motorcycle, said motorcycle including a frame and a rear wheel, a seat mounted to an upper portion of said frame, and a swing arm, one end of said swing arm pivotally attached to a lower portion of said frame, the other end of said swing arm rotatably supporting said rear wheel, comprising tubular shock absorber means, said shock absorber means having a predetermined resistance to axial compression, an upper end of said shock absorber means being pivotally attached to said upper portion of said frame; leverage means pivotally attached to said upper portion of said frame and said swing arm, including lever arm means attached to a lower end of said shock absorber means, said lever arm means and shock absorber means intersecting each other at an angle that is greater than 90° when said rear wheel is at the lower end of its vertical travel and at an angle that is substantially equal to 90° when said rear wheel is at the upper end of its vertical



travel, said leverage means providing a resistance to vertical travel of said rear wheel that progressively increases to a maximum resistance as said rear wheel approaches its upper end of vertical travel, a rate of progression of the resistance of said leverage means being greater than a rate of progression of the resistance of said shock absorber means.

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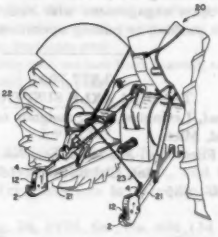
3,977,698

## COUPLING HOOK FOR A TRACTOR THREE-POINT HITCH

Wilhelm von Allworden, Lohmar, Germany, assignor to Jean Walterscheid GmbH, Lohmar, Rhineland, Germany

Filed Mar. 20, 1975, Ser. No. 560,134
Claims priority, application Germany, Mar. 26, 1974, 2414441
Int. Cl.² B60D 1/04
U.S. Cl. 280—461 A 6 Claims



1. A coupling hook particularly for a three-pont hitch on a tractor and comprising a two-armed locking element pivotally mounted within the pocket of the hook, said locking element having means defining a locking and ejecting portion on one arm thereof, a lever pivotally connected to the other arm of said locking element and having a locking face engaging a fixed portion of the hook when the lever and locking element are in the locked position, and means within the pocket of the hook for defining a fixed fulcrum about which said lever pivots when actuated to release the locking element from its locked position.

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3,977,699

## SHOCK-ABSORBING PUSH-PULL COUPLING FOR TANDEM SCRAPERS

Toshiaki Wagatsuma, Fujisawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

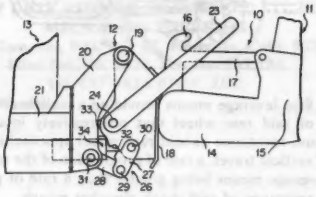
Filed June 9, 1975, Ser. No. 585,182
Claims priority, application Japan, June 12, 1975, 49-67345
Int. Cl.² B60D 3/00
U.S. Cl. 280—481 5 Claims

1. In a push-pull coupling for a tandem arrangement of tractor-scraper units wherein a first coupling section is pro-

vided which includes a first push block formed at the rear of one tractor-scraper unit and a pulling hook fixedly mounted over said first push block, the combination of said first coupling section with a second coupling section arranged on the front of the other tractor-scraper unit which includes tractor framework, said second coupling section comprising, in combination:

support means secured to said tractor framework on the front of said other tractor-scraper unit;

a second push block pivotally supported at its top end by said support means and adapted for contact with said first push block to establish a pushing relation between the tractor-scraper units;



a bail pivotally connected to said second push block at the bottom end of the latter and adapted for engagement of said pulling hook to establish a pulling relation between the tractor-scraper units;

two-way shock-absorber means arranged between the bottom end of said second push block and said tractor framework, said two-way shockabsorber means being dually effective to lessen the shock caused upon contact between said first and second push blocks and upon engagement of said pulling hook by said bail, and

means for limiting the pivotal motion of said second push block upon engagement with said first push block in either a pushing or pulling operation.

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**3,977,700**

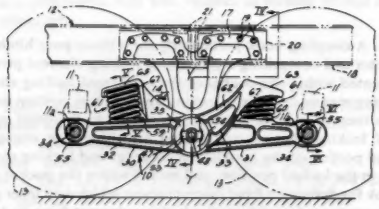
**TANDEM AXLE SUSPENSION**

**Ronn J. Leaf, Lexington, Ky., assignor to Dura Corporation, Southfield, Mich.**

**Filed Mar. 31, 1975, Ser. No. 563,298**

**Int. Cl.² B60G *11/16***

**U.S. Cl. 280—685** **16 Claims**



1. In a tandem axle suspension including a bracket having means for attaching it to the side of a vehicle frame and supporting a trunnion to project outwardly relative to the frame, a pair of beams journaled relatively rockably in side-by-side relation on the trunnion, each beam having first and second arms arranged to extend to opposite sides of said trunnion and longitudinally relative to the frame, said first beam arms projecting in opposite directions and having their distal end portions extending along a common axis and each provided with means for attaching an axle for a wheel to be located at the outer side of the suspension, the improvement comprising:

said first beam arms having respective upwardly facing spring supports each of which is offset to the inner side of the suspension a predetermined distance from said common axis;

compression spring means carried upon each of said spring supports; and

downwardly facing thrust means on each of said second beam arms complementary to and offset to the inner side of the suspension in the same manner as said spring supports and overlying and engaging compressively upon the spring means.

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**3,977,701**

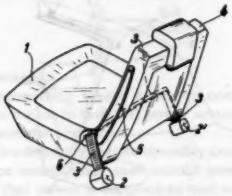
**SAFETY BELT FOR MOTOR VEHICLES**

**Per-Olaf Weman, Hasham, Germany, assignor to Sigmatex, A.G., Basel, Switzerland**

**Division of Ser. No. 316,953, Dec. 20, 1972, Pat. No. 3,887,212. This application Feb. 14, 1975, Ser. No. 550,098**

**Int. Cl.² B60R *21/10***

**U.S. Cl. 280—745** **20 Claims**



1. A safety belt apparatus for a motor vehicle comprising: a hip belt adapted to be fastened across the hips of an occupant in the vehicle, said hip belt having two ends, said hip belt secured at the two ends to the vehicle; at least one belt roller attached to an end of said hip belt; and at least one traction means which unrolls the hip belt from the belt roller when the car door is opened and releases the belt so that it can be rolled up by the belt roller to bear tightly on the body of the occupant when he is seated in a seat of the vehicle, said traction means including at least one swivel arm for pivoting upward in the longitudinal direction of the vehicle, said at least one swivel arm operatively connected adjacent one end thereof to said hip belt and pivoted adjacent the opposite end thereof on a pivot point located behind the seated occupant on a side of a seat in said vehicle.

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**3,977,702**

**PIPE COUPLING WITH RETRIEVABLE SETTING MEANS**

**William E. White, Jr., and James F. Arnold, both of Houston, Tex., assignors to HydroTech International, Inc., Houston, Tex.**

**Filed Mar. 13, 1975, Ser. No. 557,969**

**Int. Cl.² F16L *35/00***

**U.S. Cl. 285—18** **9 Claims**

1. In a pipe coupling apparatus, the combination comprising:

a housing arranged for mounting about the external surface of a pipe to which connection is to be made;

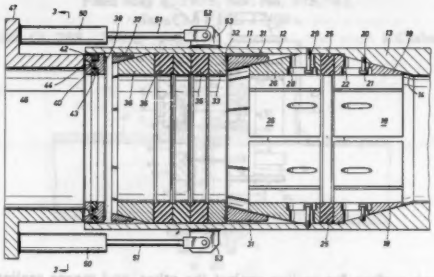
gripping means mounted in said housing for frictionally engaging the external surface of said pipe in response to a generally axial force;

deformable annular seal means mounted in said housing for sealing between said housing and said pipe upon actuation thereof;

annular thrust means for applying said axial force to said gripping means and said seal means upon actuation thereof;

detachable actuation means operably connected between said thrust means and said housing for urging said thrust means axially in said housing upon actuation thereof,

whereby said thrust means applies axial force to and causes actuation of said gripping means and said seal means;



and means actuable by said actuation means and engagable with said housing for retaining said gripping means and said seal means in said actuated position independently of said actuation means when the latter are detached from said housing, whereby said housing remains sealingly engaged with said pipe.

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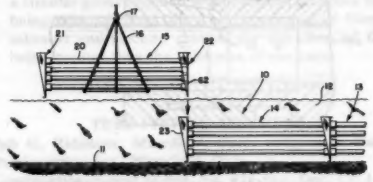
**3,977,703**

## MULTIPLE DUCT UNDERGROUND CONDUIT

**John S. Curtis, 6435 Gates Mills Blvd., Mayfield Heights, Ohio 44124**

**Filed Dec. 18, 1974, Ser. No. 533,931**
**Int. Cl.² F16L *39/00***
**U.S. Cl. 285—26** **27 Claims**



1. An underground multiple duct conduit system section for permanent installation in a trench, and adapted to be connected to identical sections to form a continuous underground multiple duct conduit system, each section comprising a plurality of parallel, equal length, single bore, semi-rigid, plastic electrical duct, and coupling plates on each end of the section, said duct and coupling plates being adapted to be preassembled before placement in the trench to form said section, and means on said coupling plates operative to connect and align the duct of one section with the duct of another in response to the lowering of the one assembled section into the trench adjacent another assembled section already in the trench.

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**3,977,704**

## PIPE COUPLER

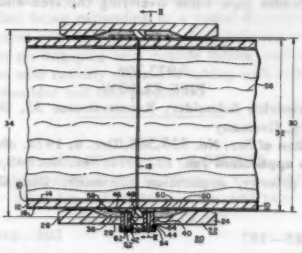
**Jeffry R. Meyer, Wilkins Township, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jan. 12, 1976, Ser. No. 648,443**
**Int. Cl.² F16L *13/10***
**U.S. Cl. 285—27** **7 Claims**

1. A coupler for sealingly connecting two sections of pipe having a gas disposed therein, said pipe sections having the same outside diameter, said coupler comprising:

an annular, elongated coupling member comprising two end sections and an intermediate section therebetween, said end sections having an inside diameter substantially the same as said pipe outside diameter, said intermediate section having an inside diameter greater than said pipe outside diameter, said pipe sections being disposed within said coupling member and forming a joint between said pipe sections, said joint being longitudinally positioned along said coupling member within said intermediate section, said intermediate section and said pipe sections forming an annular space therebetween, said intermediate section having a pair of longitudinally spaced apart openings therein;

a pair of filling plugs sealingly disposed within said intermediate section openings and extending inwardly into said annular space;



an annular, elongated sealing gasket having an inside diameter substantially the same as said pipe outside diameter disposed within said annular space adjacent said pipe joint, said gasket having a radially outwardly extension positioned intermediate said filling plugs within said annular space, said filling plugs inhibiting longitudinal movement of said gasket through said gasket extension;

an adhesive sealant disposed within and substantially filling said annular space between said gasket and said coupling member, said sealant entering said annular space through said filling plugs, said sealant compressing said gasket against said pipe sections; and

means for preventing said sealant from leaving said annular space through said filling plugs.

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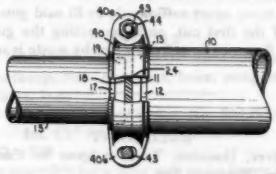
**3,977,705**

## REDUCING TYPE COUPLING

**Leo K. Thiessen, Shawnee Mission, Kans., and Conrad B. Smith, Houston, Tex., assignors to Aeroquip Corporation, Jackson, Mich.**

**Filed Aug. 20, 1975, Ser. No. 606,124**
**Int. Cl.² F16L *17/00***
**U.S. Cl. 285—112** **20 Claims**



1. A gasket for sealing the joint between aligned sections of pipe of different diameters,

said gasket comprising a short circular member substantially frusto-conical in axial cross-section,

said member having a base portion, two end portions extending radially inwardly from said base portions at the longitudinal ends thereof and a radially inwardly extending internal rib extending from said base portion of the gasket intermediate the end portions thereof,

said end portions terminating inwardly in opposed, laterally extending lips,

said gasket having two external, circumferential ribs positioned substantially at the longitudinal ends thereof extending radially outwardly from said member base portion,

there being an external, substantially frustoconical transition section extending between said two ribs,

said internal rib configured so as to provide a substantially frusto-conical, inboard transition section extending between the portion of the gasket adapted to receive the larger pipe and a portion of the gasket adapted to receive the smaller pipe while overlying the free ends of said pipes.

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**3,977,706**

**PIPE ELBOW**

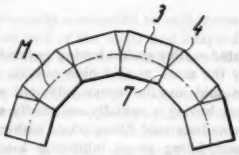
**Johann Friedrich Schneider, Roemerstrasse 33, D-638 Bad Homburg, Germany**

**Continuation of Ser. No. 530,365, Dec. 6, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,464**

**Claims priority, application Germany, Dec. 24, 1973, 2364552**

**Int. Cl.² F16L *43/00***

**U.S. Cl. 285—157** **1 Claim**




1. A pipe elbow or bend comprising at least two pipe sections and a gusset cut from a continuous piece of pipe having a longitudinal central axis, said pipe sections being secured to each other along a seam forming a Y-configuration, said sections and gusset resulting from making three cuts into said continuous piece of pipe, one cut running from one side into said pipe in a plane extending at a right angle relative to said longitudinal central axis, a further cut extending from the opposite side into the pipe at a given angle relative to said plane, and to a point where the further cut meets the first mentioned cut, and a third cut extending also from the opposite side of the pipe at said given angle relative to said plane but opposite said further cut, said third cut also running to said point so that all three cuts meet whereby the gusset is formed by the further and third cut, said Y-configuration of the seam resulting from removing the gusset from between the further and third cut, connecting the edges of the pipe sections along the further and third cut to each other, whereby the edges of the first cut move apart sufficiently to fit said gusset between the edges of the first cut, and connecting the gusset to the edges of the first mentioned cut whereby waste is substantially avoided.

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**3,977,707**

**BALL JOINT**

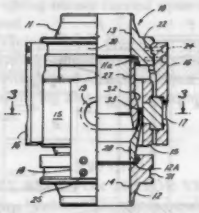
**John P. Oliver, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.**

**Filed Jan. 20, 1975, Ser. No. 542,294**

**Int. Cl.² F16L *27/04***

**U.S. Cl. 285—265** **13 Claims**

1. A ball joint, comprising a pair of tubular end members, means connecting the end members for pivoting between positions in which their axes are aligned and angularly disposed with respect to one another, a pair of replaceable sleeves within the connecting means each having one end releasably connected to one of the end members, the other end of one sleeve having a convex surface which is spherical about a center at substantially the intersection of said axes, and the other end of the other sleeve having an internal surface close about the spherical surface, a seal ring carried by



one surface for sealing against the other, and means sealing between the one end of each sleeve and the end member to which it is connected.

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**3,977,708**

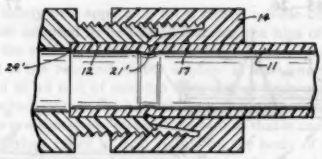
**PLASTIC TUBE FITTING AND JOINT**

**Gerhard P. Jopp, Wayzata, Minn., assignor to Fluoroware, Inc., Chaska, Minn.**

**Filed Sept. 11, 1975, Ser. No. 612,290**

**Int. Cl.² F16L *19/00***

**U.S. Cl. 285—342** **11 Claims**




1. An injection molded plastic fitting for connection to a plastic tube, comprising:

a molded plastic body sleeve having a threaded exterior and a longitudinal bore snugly receiving the end of the tube;

molded plastic tube-clamping means including a threaded nut on the threaded exterior of the sleeve for longitudinal movement along the sleeve, and also including a ferrule integrally of and in one piece with the nut, the ferrule embracing the tube and driven longitudinally along the tube and sleeve by the nut, the ferrule having a blunt end and also having a conical outer peripheral surface with a gradual wedging taper converging toward the sleeve, the nut and ferrule having a smooth-surface inner bore,

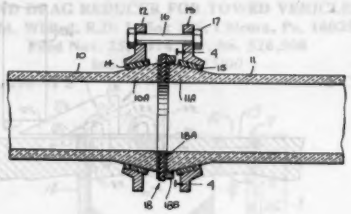
the body sleeve having a flared ferrule-receiving inner periphery between the bore and the end of the sleeve, the flared periphery having a conical ferrule-wedging surface adjacent the end of the sleeve and tapering along its length at a narrow angle relative to the body sleeve axis and tapering in the same direction as the conical surface of the ferrule, said flared periphery freely receiving the tapered ferrule substantially to the full length of said ferrule-wedging surface and thereafter snugly mating with the ferrule, and the flared periphery also having a conical ferrule-deforming surface adjacent the bore and with a steep angled taper obliquely oriented with respect to the ferrule-wedging surface of the flared periphery at a significant angle, the steep angled taper of the ferrule-deforming surface forming and directing the end of the ferrule inwardly of the bore and into embedded condition in the tube.

3,977,709

## UNIVERSAL INTERFACE GASKET

Peter T. Hatzis, Dresher, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed May 8, 1975, Ser. No. 575,742
Int. Cl.² F16L 17/06
U.S. Cl. 285—368 1 Claim



1. An interface gasket interposed between the conical ends of two glass pipes which are joined together to form a flow line, the gasket being compressed between the pipe ends by means of flanges mounted on the pipe ends and interconnected by bolts to effect a joint seal, said gasket comprising:

A. an annular one-piece sheath formed of a fluoro-carbon polymer having an inner diameter corresponding to the inner diameter of the pipes which are joined, said sheath having only one relatively thick projecting rim having a uniform inner and outer diameter which encircles one of said conical pipe ends and engages only the extremity thereof, and

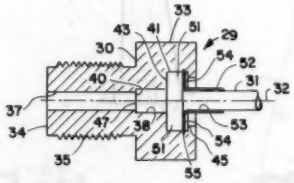
B. a ring-shaped core of compressible material received in a circular groove formed in said sheath, said core material being selected from the class consisting of Neoprene-asbestos and silicone rubber, the thickness of the rim being greater than the thickness of the core.

3,977,710

## TUBE FITTING ASSEMBLY

Ralph G. Ridenour, Mansfield, Ohio, assignor to Universal Refrigeration Inc., Mansfield, Ohio

Continuation-in-part of Ser. No. 425,561, Dec. 17, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 554,395
Int. Cl.² F16L 13/14
U.S. Cl. 285—382.5 11 Claims



1. A tube fitting assembly comprising in combination:

a fitting having a first surface defining a first orifice through at least a portion of said fitting;

said fitting having a second surface defining a second orifice through a portion of said first orifice and establishing a first shoulder in proximity to the junction of said first and second orifices;

said second orifice having a greater cross-sectional area than said first orifice;

a tubing having an inside tubing wall surface and having an outside tubing wall surface occupying said first and second orifices and having a portion of the tubing wall engaging said first surface defining said first orifice;

a restraining member having an internal orifice commensurate with the cross-sectional area of said outside tubing wall surface of said tubing;

said restraining member having a radially extending projection;

means for mounting said restraining member on said tubing with said internal orifice of said restraining member cooperating with said outside tubing wall surface of said tubing;

a radially expanded portion of said outside tubing wall surface engaged with said second surface of said second orifice;

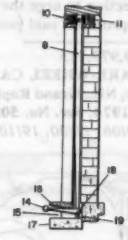
and said radially extending projection of said restraining member being expanding in a radial direction into engagement with said second surface defining said second orifice an engaging said outside tubing wall surface to secure said radially expanded tubing wall between said first shoulder and said projection.

3,977,711

## SASH LOCK FOR CLOSURES

Stephan Lajcak, 6690 Irving St., Denver, Colo. 80221

Filed Jan. 12, 1976, Ser. No. 648,142
Int. Cl.² E05C 3/04
U.S. Cl. 292—202 9 Claims



1. In a closure arranged for opening movement in a closure opening, said closure and opening being framed, a portion of said closure frame having a channel formed therein and extending therealong, a concave channel provided adjacent said first mentioned channel, a cam rod having a curved side wall seated in and arranged for rotation in said concave channel, said rod being inset longitudinally to provide a flange extending spirally from end to end thereof, an operating lever on one end of said rod, said rod being rotated by said lever to interfit said spiral flange in said first mentioned channel whereby continued rotation of said lever twists said rod and progressively forces said flange into engagement with said channel for locking said closure in closed position.

3,977,712

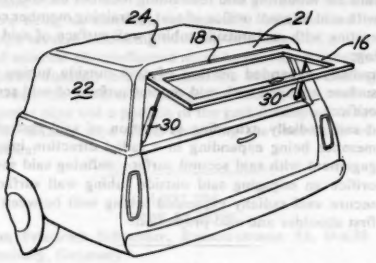
## VEHICLE DOOR PROP ASSEMBLY

Lyle M. Northrop, New Hampton, Iowa, assignor to Winlite, Inc., Elkhart, Ind.

Filed Sept. 7, 1974, Ser. No. 504,023
Int. Cl.² E05C 17/44; E05F 5/00
U.S. Cl. 292—338 7 Claims

1. A prop assembly for a door unit and a frame unit with the door unit being hung from the top and adapted to swing upwardly to approximately a horizontal position, said prop assembly comprising a cylinder having a member in one end, a rod disposed in axial parallel relation in said cylinder and projecting outwardly from the other end, a fixture pivotally connected on a transverse axis to the end of said cylinder opposite said rod and having a laterally extending member for securing said assembly to a supporting member on one of said units, a fixture pivotally connected to the outer end of said rod for connection to the other of said units and having a base

member and an upstanding stem connected perpendicularly to said base member for axial rotation thereon, pivot means connecting said stem to said rod for pivotal movement relative thereto, said pivot means having a connecting pin disposed on an axis transverse to said stem, and a spring means in said




cylinder reacting between said end member and said rod for urging said rod outwardly to lift the door unit and to hold it in open position and said stem on said second mentioned fixture being sufficiently long to cause said spring and rod to exert a pressure in the direction to urge the door unit toward closed position when it approaches said position.

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**3,977,713**

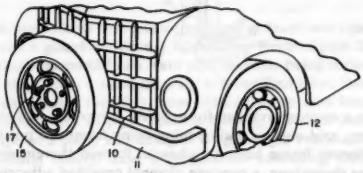
**RESILIENT SPARE-WHEEL CARRIER**

**Melvin L. Guin, 226 Travis, NE., Grand Rapids, Mich. 49505**

**Filed Sept. 5, 1974, Ser. No. 503,445**

**Int. Cl.² B60R** *9/06, 11/00, 19/10, 27/00*

**U.S. Cl. 293—69 R** **2 Claims**




1. A rack for mounting a spare tire and wheel on a vehicle having a frame and a front bumper, comprising:

a rigid frame structure, adapted to be affixed to said vehicle frame and said bumper having a vertical member extending forwardly and upwardly of said bumper;

a tubular housing secured to and projecting horizontally forward from said vertical member adjacent the upper end thereof;

a tire and wheel mounting assembly including a mounting plate having a plurality of studs secured to and projecting from one face thereof and spaced so as to align with standard wheel mounting holes and a tubular shaft secured to and projecting from the opposite face of said plate, said shaft being received in said tubular housing and capable of sliding and rotational movement therein;

spring means biasing said mounting assembly forwardly relative to said housing; and

retainer means limiting the forward movement of said mounting assembly relative to said housing.

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**3,977,714**

**STOP ASSEMBLY**

**Floyd Arthur Trotter, 205-678 W. 45 Ave., Vancouver, British Columbia, Canada**

**Filed Mar. 3, 1975, Ser. No. 554,499**

**Int. Cl.² E05C** *17/54*

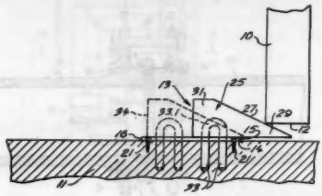
**U.S. Cl. 292—343** **3 Claims**

1. A door stop assembly for employment between the lower edge of a door and a floor over which the door swings comprising:

a. a stop member having a nose portion insertable beneath the door and a butt portion for engaging the door, said stop member having a flat floor engaging undersurface,

b. a "U" bolt embedded in the stop member having legs projecting from the undersurface thereof,

c. a floor plate adapted to be secured to the floor adjacent the door and having at least one pair of openings for




slidably receiving the legs of the "U" bolt so as to prevent lateral and rotative movement of the stop member relative to the door,

d. the stop member being formed of a resilient material so as to enable said member to be flexed upwards away from the floor when in jamming position beneath a closed door so as to enable the legs to be inserted in the openings of the floor plate.

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**3,977,715**

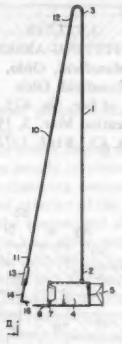
**PICKUP KIT FOR ANIMAL DROPPINGS**

**David A. Casci, Palo Alto, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Apr. 28, 1975, Ser. No. 572,276**

**Int. Cl.² A01K** *29/00;* **A47L** *13/52*

**U.S. Cl. 294—19 R** **2 Claims**




1. A pickup kit for animal droppings, said pickup kit comprising

an elongated rod-like handle member having a pair of opposite first and second ends;

a sleeve-like member affixed to the first end of the handle member in substantially perpendicular relation thereto;

a disposable bag removably accommodated in the sleeve-like member and maintained thereby in open condition, said bag having an open mouth with an edge and a substantially rigid substantially plate-like blade-type collar projecting outward from the edge;

an elongated rod-like shovel handle having a pair of first and second ends, the shovel handle and the handle member being affixed to each other at the second ends thereof to form a single substantially resilient substantially V-shaped rod;

a clamping member affixed to the first end of the shovel handle; and

a disposable shovel member releasably clamped by the clamping member for shoveling animal droppings into the bag.

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3,977,716

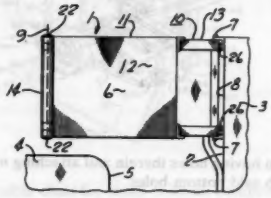
## WIND DRAG REDUCER FOR TOWED VEHICLES

Dexter M. Whited, R.D. 1, Box 106, Chicora, Pa. 16025

Filed Nov. 25, 1974, Ser. No. 526,508

Int. Cl.² B62D 35/00

U.S. Cl. 296—1 S 5 Claims



1. In combination, a motor vehicle trailer combination with a wind drag reducer for trailers which are exposed above the roof of the motor vehicle connected to pull the same, comprising two vertical side panel means each respectively hinged at one end to the trailer adjacent the front side edges thereof and converging forward to a vertical line midway between said front side edges where they are vertically hinged together overtop of the roof of the motor vehicle connected to pull said trailer, said two side panel means each consisting of two parallel overlapping panel members interengaged to slide forwardly and rearwardly relative to each other to extend and retract said wind resistance apparatus, drive means anchored between the front of said trailer and said forward hinge connection to extend or retract said apparatus.

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3,977,717

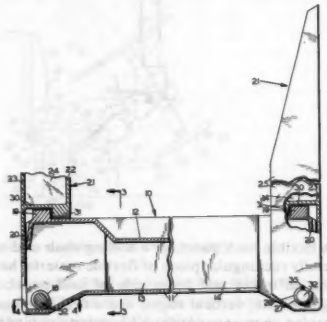
## LOG BUNK WITH REMOVABLE, NON-TRIP STAKES

Dennis Ray Hassell, 250 Dead Indian Road, P.O. Box 219, Ashland, Oreg. 97520

Filed Mar. 17, 1975, Ser. No. 559,089

Int. Cl.² B60P 7/06

U.S. Cl. 296—43 2 Claims



1. A log bunk comprising:

a. a frame adapted for mounting transversely of a vehicle, the opposite end portions of the frame each having a pair of longitudinally spaced side plates and a top plate,

b. a pair of elongated non-trip stakes, one for each of said opposite end portions of the frame, the lower portion of each stake including a pair of spaced side plates and a medial plate, said lower portion being open at its front and bottom sides, whereby to interfit removably with its associated end portion of the frame with the side plates of the frame and stake disposed adjacent each other and the medial plate of the stake overlying the top plate of the frame,

c. a readily removable pin extending through registering openings in the side plates of the frame and stake when the frame and stake are in said interfitted arrangement whereby the removal of the stake from the frame requires the removal of the pin, and

d. interengageable abutments on each top plate and medial plate securing the stake against laterally outward pivotal movement about the axis of its associated pin when the pin interconnects said side plates.

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3,977,718

## TURNABLE TRUCK GATE

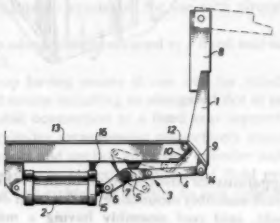
Carl-Eric Bertil Nordberg, Satunavagen 24 D, S-195 00 Marsta, Sweden

Filed Jan. 15, 1975, Ser. No. 541,291

Claims priority, application Sweden, Jan. 17, 1974, 7400636

Int. Cl.² B62D 33/02

U.S. Cl. 296—57 R 12 Claims



1. A turnable gate arrangement for a truck platform (13), comprising:

a gate (1) pivotally mounted along an edge portion thereof relative to the truck platform (13) and pivotable between at least a closed locked position and an open unlocked position, the portion of the gate remote from said edge portion being higher in the closed locked position than in the open unlocked position;

drive means (2);

a link coupling (3) operably coupling the gate (1) to the drive means (2) and which is arranged to lock the gate (1) in the non-activated state of the drive means (2), the link coupling (3) including first, second and third links (4, 5, 6, respectively), and a stationary but turnable shaft (7), the first link (4) of the link coupling (3) being articulately connected to the gate (1) at a first fulcrum and articulately connected to one end of the second link (5) at a second fulcrum, the other end of the second link (5) being fixedly connected to the shaft (7), the second link (5) being movable by rotation of the shaft (7), the third link (6) being fixedly connected to the shaft (7) and being further connected to the drive means (2), the drive means (2) when actuated moving the third link (6) to impart rotation to the shaft (7) to cause the gate (1) to turn to an unlocked position via the first (4) and second (5) links;

said second fulcrum, in the locked position of the gate (1) and in the non-activated state of the drive means (2), lying along a substantially straight line passing between the center of the shaft (7) and said first fulcrum to maintain the locked position of the gate (1); and

said second fulcrum being movable upwards upon actuation of the drive means (2) to unlock the gate (1), under the

influence of rotation of the shaft (7) via the drive means (2) and third link (6).

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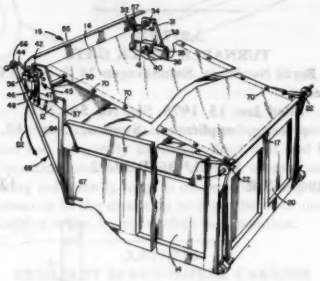
**3,977,719**

## APPARATUS FOR COVERING OPEN-BODIED VEHICLES

**Howard E. Thurston, Union Road, Stratham, N.H. 03885**

**Filed Apr. 28, 1975, Ser. No. 572,405**
**Int. Cl.² B60J 7/02**
**U.S. Cl. 296—98** **6 Claims**



1. Apparatus for covering open-bodied vehicles comprising:
a. a reel assembly mountable on the front of an open vehicle body, said reel assembly having a manually operable reeling crank;
b. a tarpaulin mounted for reeling on said reel assembly and extendable to cover said body;
c. a rigid hollow pipe secured to the extendable end of said tarpaulin;
d. retaining elements mounted at the rear of said body for securing said pipe when said tarpaulin is in the extended condition; and
e. an elongated rigid manual implement 4 to 8 feet long comprising a shaft, a solid bar extending at one end of said shaft and bent at an angle with respect to the axis of said shaft for insertion into a hollow end of said pipe to provide a rigid connection to said pipe, and a loop connected to said shaft and spaced longitudinally away from said bar, said loop shaped to fit over said crank whereby said implement may be used to manually lift said pipe and move the extendable end of said tarpaulin and also to operate said crank for reeling up said tarpaulin.

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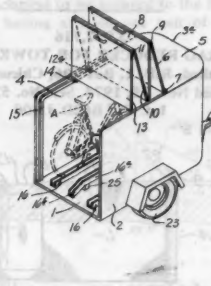
**3,977,720**

## CYCLE STORAGE, SHIPPING AND CONVEYING MEANS

**Harry Schreiberg, 5 Fenceline Drive, Gaithersburg, Md. 20760**

**Filed July 26, 1973, Ser. No. 382,941**
**Int. Cl.² B60P 3/06**
**U.S. Cl. 296—137 C** **3 Claims**

1. A cycle housing comprising a housing having a bottom, opposite side walls extending normal and fixed to said bottom and a front wall extending from and between said bottom and said side walls leaving an open end and top to said housing, at least one track having a U-shaped cross-sectional configuration fixedly mounted on said bottom inside said housing and extending normal to said front wall, closure means slideably mounted on and extending between said side walls and capable of closing said housing open end and top when desired,



said bottom having holes therein and attaching means extending through said bottom holes.

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**3,977,721**

## REPLACEABLE FLEXIBLE BACK PANEL FOR FOLDING CHAIRS

**Walter F. Peterson, Racine, Wis., assignor to Gold Medal, Inc., Racine, Wis.**

**Filed June 26, 1975, Ser. No. 590,451**
**Int. Cl.² A47C 4/28**
**U.S. Cl. 297—45** **5 Claims**

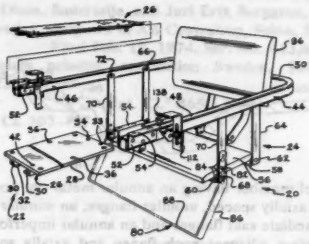
1. A flexible back panel for a folding chair and comprising, a generally rectangular piece of flexible material having a welt defining an upper and lower side of said panel, said panel having opposite, vertical edges, and a first loop and a second loop having open upper ends and forming a pair of loops along each of said opposite edges for the selective reception of a folding chair back post therein, said second loops being located generally concentrically within their respective first loops, said first loops of said pairs of loops being spaced farther apart from one another than the second loops of said pairs of loops, whereby the effective length between the first loops is greater than the length between the second loops.

3,977,722

## RETRACTABLE CHAIR FOR A TABLE OR THE LIKE

Lanny J. Gist, Bowling Green, Ohio, assignor to Colorado Leisure Products, Inc., Broomfield, Colo.

Filed Nov. 4, 1974, Ser. No. 520,481
Int. Cl.² A47D 1/10
U.S. Cl. 297—143 8 Claims



1. A retractable chair for small children comprising a seat, means connected to said seat for supporting said seat from a table and for enabling said seat to be moved relative to the table between an extended, operable position and a retracted, stored position, said connecting means including a frame and track means attachable to the bottom surface of a top of the table for slidably supporting said frame, catch means for providing additional support for said seat from said table when said seat is in the extended, operable position, said catch means comprising an L-shaped catch pivotally supported by said frame and a cam plate associated with said track means and engageable with said catch to move said catch between the supporting position relative to the table top and a position spaced from the table top, and latch means for holding said seat in a fixed position relative to the table when in the extended position and to maintain said catch means in the supporting position relative to said table.

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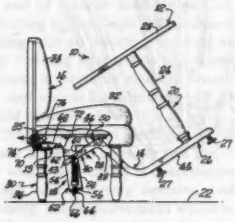
3,977,723

## FURNITURE COMBINATION

Ferris E. Jones, 943 Millbury Ave., La Puente, Calif. 91746

Filed Dec. 30, 1974, Ser. No. 537,258
Int. Cl.² A47B 39/00
U.S. Cl. 297—173 13 Claims



1. A furniture combination comprising:
a support,
arm means rigidly fixed at one end to said article and extending laterally of said article toward said support at a fixed angle relative to said article,
an article of furniture in front of said support,
means pivotally mounting said arm means on said support adjacent the one end of said arm means for vertical swinging movement of said article between a lower position of use wherein the article rests on the floor and a raised position wherein the article is elevated above the floor to permit cleaning the floor below the article, and
means connected between said support and said arm means for resiliently biassing said article upwardly to said raised position.

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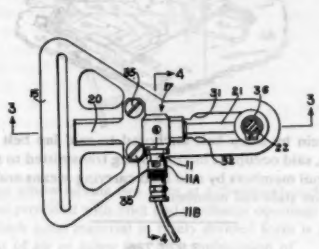
3,977,724

## LAP BELT TIGHTENER

Lennord L. Pitney, Park Rapids, Minn., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 11, 1975, Ser. No. 595,193
Int. Cl.² A62B 35/00
U.S. Cl. 297—385 3 Claims



1. In lap belt tightener apparatus for use with aircraft seat belts,
an anchor loop adapted to be secured to a fixed seat support of an aircraft,
said anchor loop having means at one end for attaching a seat belt and means including an elongated slot at another end for slidable connection to a fixed seat support,
a piston and cylinder arrangement respectively secured to said seat support and anchor loop, said cylinder including means responsive to selectively delivered fluid pressure for imparting belt tightening motion to said cylinder and anchor loop,
a tightener housing member integral with and extending laterally of said cylinder, and
means mounting an electric ignition element on said tightener housing member,
said ignition element having a lug releasably secured to a slotted bayonet connector on an electric wire,
said tightener housing member having a passageway for delivering pressure fluid developed by said electric ignition element to said cylinder.

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3,977,725

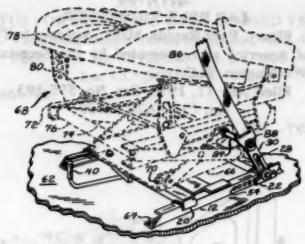
## FORE AND AFT ADJUSTMENT MECHANISM AND SEAT BELT ANCHORAGE FOR SUSPENSION SEAT

Harvey N. Tengler, New Berlin, and Larry F. Stikeleather, Hales Corners, both of Wis., assignors to UOP Inc., Des Plaines, Ill.

Filed Oct. 24, 1975, Ser. No. 625,419
Int. Cl.² A62B 35/00
U.S. Cl. 297—385 10 Claims

1. In a vehicle suspension seat having a seat member movable up and down and fore and aft relative to the floor of a vehicle in which it is mounted, the improvement comprising a pair of guide rail members adapted to be fastened to the floor of a vehicle, a pair of seat member supporting slide rail members interlocked with said pair of guide rail member for fore and aft sliding movement relative thereto, manually operable locking means for locking the ends of at least one of said pair of slide rail members to said pair of guide rail members in a selected position of fore and aft adjustment, lap belt support members fixedly mounted on each side of said seat member for movement therewith, a support member fixedly mounted on each end of said at least one slide rail member and load carrying means mounted between said lap belt support members and said support members which are mounted

on said at least one slide rail member, said pair of guide rail members being adapted to receive and transmit to the floor of a vehicle to which said pair of guide rail members is adapted to be affixed, all of the loading of said seat and of an occupant



held therein by a lap belt anchored to said lap belt support members, said occupant loading being transmitted to said pair of guide rail members by said load carrying means and by said at least one slide rail member.

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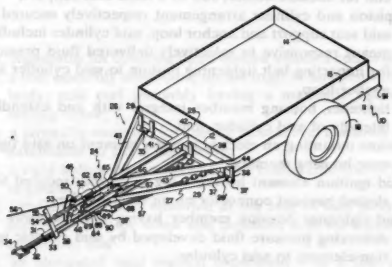
3,977,726

**DOUBLE HITCH TILTABLE TRAILER**

Metro Prestayko, General Delivery, Valley River, Manitoba, Canada

Filed Jan. 20, 1975, Ser. No. 542,490
Int. Cl.² B60P 1/04
U.S. Cl. 298—5 12 Claims



1. A tiltable trailer and hitch movable from a towing position to a tilted position and vice versa and adapted to be connected to a towing vehicle; comprising in combination a trailer frame, load carrying means on said frame, a transverse axle secured to said frame, ground engaging wheels journalled for rotation one on each end of said axle, a lower hitch assembly extending from said trailer forwardly of said axle, an upper hitch assembly extending from one end of said trailer above said lower hitch assembly, said lower hitch assembly connecting with said towing vehicle by one end thereof, and being pivotally secured transversely to said trailer forwardly of said axle, and releaseable latch means between said upper and said lower hitch assemblies normally maintaining said trailer in the towing position but releasing said trailer for rearward tilting action whereby said trailer may be moved to the tilted position, means to release and secure said latch means, said latch means including a clevis pivotally supported on said lower hitch assembly, over center means normally urging said clevis rearwardly towards said trailer and extendable and retractable spring loaded, means connected by one end thereof to said lower hitch assembly and by the other end thereof to said frame to firstly initiate the tilting of said trailer frame when said latch means is released and secondly to cushion the return movement of said trailer frame to the towing position.

3,977,727

**RIM WITH BEAD UNSEAT RESTRAINT**

William A. Glasenapp, Medina, and Michael G. Miller, Cuyahoga Falls, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed June 9, 1975, Ser. No. 585,324
Int. Cl.² B60B 21/10
U.S. Cl. 301—97 9 Claims

1. In a wheel member having an annular metal rim portion with a pair of axially spaced, annular flanges, an annular well portion intermediate said flanges and an annular imperforate, bead seat portion adjacent each flange and axially spaced from said well portion, each bead seat portion having a radially outer, annular surface for seating the base of each bead portion of a pneumatic tire, the improvement comprising a plurality of radial metallic projections integral with and raised only from portions of each seating surface to penetrate a portion of the base of each bead portion of a pneumatic tire.

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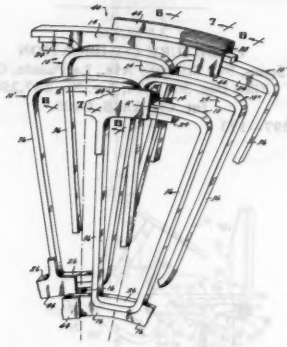
3,977,728

**WHEEL**

Stephen C. Mitchell, West Chester; Arthur P. Adamson, Cincinnati; Max F. Grandey, Hamilton, and Lewis J. Stoffer, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 30, 1974, Ser. No. 537,359
Int. Cl.² B60B 1/14
U.S. Cl. 301—66 16 Claims



1. A spoked frame comprising:

a plurality of axially displaced wheels having a common hub axis, at least one of said wheels comprising a laminate of a plurality of wheel plies and intermediate plies in axially alternating relationship and bonded together, wherein

said wheel plies each include an inner hoop, a radially displaced outer hoop and a plurality of circumferentially spaced continuous spoke loops, each of said loops partially entrapped within said inner hoop and said outer hoop and forming pairs of spokes extending therebetween; and

said intermediate plies each comprise a unitized spoked ply of substantially the same contour as said wheel plies;

fairing means to substantially envelope said spokes; and retainer means to retain said wheels in a predetermined axial relationship to each other.

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3,977,729

## OUTDOORS REFUSE-RECEIVING SYSTEM

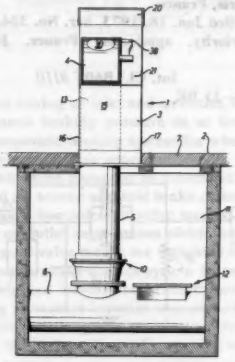
Dag Olson, Sodertalje, and Jarl Erik Berggren, Solna, both of Sweden, assignors to AB Centralsug, Solna, Sweden

Filed Feb. 19, 1974, Ser. No. 443,640

Claims priority, application Sweden, Feb. 20, 1973, 7302382

Int. Cl.² B65G 53/46

U.S. Cl. 302—27 19 Claims



1. In a sluice-like refuse-inserting means for attachment to the upper end of a chute forming part of a suction-operated refuse collecting system, said refuse-inserting means comprising: a housing with an inserting opening and, on a lower level, a discharge opening adapted to communicate with the upper end of a chute; a rotatable element bounding a refuse receiving cavity; and means for adjusting said element alternatively from one end position of rotation in which said cavity is accessible from the environment through said inserting opening and closed at said discharge opening and the other end position of rotation in which said cavity is inaccessible from the environment through said inserting opening and open at said discharge opening; the improvement wherein said rotatable element includes: a hollow cylindrical drum; means for rotating said drum approximately 90° about a horizontal axis behind said inserting opening; said drum having opposed first and second openings through the peripherhal surface of the drum with said second drum opening being of larger area than said first drum opening and wall means extending from the perimeter of said first opening to the perimeter of said second opening to delimit said cavity, said first drum opening being exposed behind the inserting opening in said housing in the one end position of drum rotation and said second drum opening being exposed in the discharge opening in said housing in the other end position of drum rotation for gravity discharge of refuse previously introduced into said cavity while simultaneously said first drum opening is exposed to the atmosphere in the interior of said housing.

3,977,730

## JUNCTION ELEMENTS FOR PNEUMATIC CONVEYOR PIPES

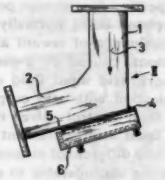
Günter Seick, Wanne-Eickel, Germany, assignor to Steag Aktiengesellschaft, Essen, Germany

Filed Sept. 16, 1974, Ser. No. 506,016

Claims priority, application Germany, Sept. 18, 1973, 7333839[U]

Int. Cl.² B65G 53/52

U.S. Cl. 302—64 1 Claim



1. In an elbow having two arms at a divergent angle to each other and provided with inlet and discharge openings for pipes along which solid material in finely divided form is passed in a current of air or other gas, the combination of

a flat impact plate fixed to the outer side of said elbow adjacent the apex of the angle between the arms thereof,

a frame having a pair of U-shaped members facing each other to provide an open ended channel,

welded connections between the edges of said frame members and the ends of said impact plate respectively,

a flat reinforcing plate in slidable engagement with said channel to bear flatwise against said impact plate, and

screw members on said frame for releasably urging said reinforcing plate against said impact plate.

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3,977,731

## FLUID PRESSURE CONTROL DEVICE WITH A FAILURE ALARM FOR A VEHICLE BRAKE SYSTEM

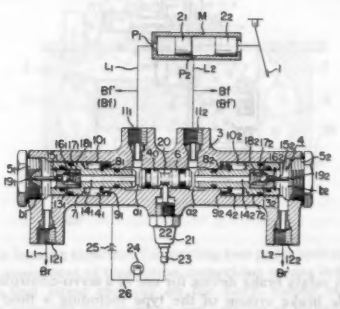
Hiroshi Kasahara, Ueda, Japan, assignor to Nisshin Kogyo Kabushiki Kaisha, Ueda, Japan

Filed Apr. 22, 1975, Ser. No. 570,498

Claims priority, application Japan, May 7, 1974, 49-50569

Int. Cl.² B60T 8/26

U.S. Cl. 303—6 C 6 Claims



1. A fluid-pressure control device with a failure alarm indication, for a vehicle brake system of the type including a dual brake master cylinder having a pair of independent fluid outlet ports, a pair of fluid lines respectively extending from said outlet ports, and at least a pair of rear wheel brakes having fluid chambers respectively connected with said fluid lines, the control device comprising: a casing connected across said fluid lines midway thereof and having a stepped cylinder bore defined therein; a pair of differential pistons slidably accommodated in said bore, each having inner and outer end faces,

the latter being somewhat larger than the former; said differential pistons having axially inner and outer sides; a balance piston slidably accommodated in said bore between said differential pistons; biasing means arranged between a shoulder in said bore and a portion of said differential pistons to bias the latter in an axially outward direction at a prescribed pressure; a pair of input fluid chambers defined in said bore between said balance piston and said differential pistons and communicating with respective upstream portions of said fluid lines; a pair of output fluid chambers also defined in said bore on said axially outer sides of the differential pistons and communicating with respective downstream portions of said fluid lines; said balance piston being normally held in a neutral position under the influence of inward axial movements of said differential pistons, caused by a pressure rise in said output fluid chambers; said input fluid chambers being in respective communication with said output fluid chambers through respective fluid control valves that are selectively opened and closed upon axial movement in the outward or inward direction of said differential pistons; and a switch unit mounted on said casing and operable to actuate an external alarm when said balance piston is axially displaced from the neutral position beyond a definite limit, wherein said communication between the input and the output fluid chambers is by way of substantially axial fluid passages in said differential pistons, said passages incorporating said control valves.

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**3,977,732**

## SAFETY BRAKE DEVICE FOR SERVO-CONTROLLED BRAKE SYSTEM

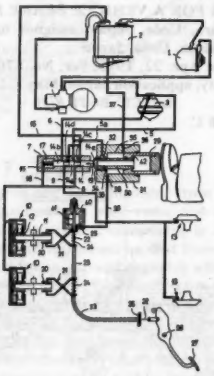
**Albert Grosseau, Paris, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France**

**Filed May 21, 1975, Ser. No. 579,728**

**Claims priority, application France, May 27, 1974, 74.18253**

**Int. Cl.² B60T *15/16***

**U.S. Cl. 303—6 R** **10 Claims**



1. A safety brake device for use in a servo-controlled motor vehicle brake system of the type including a fluid pressure source, fluid operated vehicle braking means, safety vehicle braking means, servo valve means fluid connected between said fluid pressure source and said fluid operated vehicle braking means, and movable conventional foot-operated servo-control means for selectively operating said servo valve means to supply fluid under pressure from said fluid pressure source to said fluid operated vehicle braking means for a normal braking operation; said device comprising:

an intermediate member means adapted to be operatively connected between said servo-control means and said servo valve means for transmitting movement of said servo-control means to said servo valve means;

means, responsive to pressure from said fluid pressure source, for locking said intermediate member means in a fixed position with respect to said servo-control means during normal braking operation and for releasing said servo-control means upon drop of pressure in said fluid pressure source; and

said servo-control means, upon release from said intermediate member means, being movable by an additional amount beyond normal braking movement and connected to said safety vehicle braking means to operate said safety vehicle braking means.

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**3,977,733**

## ANTISKID BRAKING SYSTEM

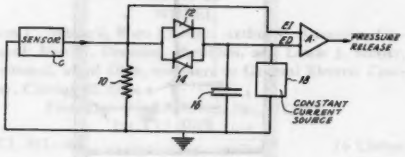
**Guy Marouby, Neuilly, and Christian Tanguy, Frepillon Val D'Oise, both of France, assignors to Societe Anonyme D.B.A., Paris, France**

**Filed Jan. 18, 1973, Ser. No. 324,728**

**Claims priority, application France, Jan. 25, 1972, 72.02302**

**Int. Cl.² B60T *8/10***

**U.S. Cl. 303—21 BE** **7 Claims**




1. In a wheeled vehicle having a brake controlling one of said wheels, an adaptive braking system for controlling said brake comprising:

means for generating a first signal proportional to the rotational velocity of said wheel,

means for generating a second signal having a value proportionally less than that of said first signal prior to a brake application, said second signal generating means including means to limit the decrease of said second signal to a predetermined maximum rate regardless of the rate of decrease of said first signal during a brake application, whereby the value of said first signal initially becomes equal to the value of said second signal if the first signal decreases in excess of said predetermined maximum rate,

means for effecting a brake pressure reduction when the value of said first signal initially becomes equal to the value of said second signal,

said second signal generating means further including means permitting the value of said second signal to decrease in proportion to the subsequent decrease in the value of said first signal after the value of the latter drops below the value of said second signal by a predetermined amount, said means limiting the decrease of said second signal decreasing the latter at said predetermined rate when the decrease in the value of said first signal terminates so that the difference in said first and second signals becomes less than said predetermined amount whereby the value of said first signal will again become equal to said second signal,

said means for effecting a brake pressure reduction terminating said reduction when the value of said first signal again becomes equal to said second signal.

3,977,734

## VALVE UNIT FOR BRAKING PRESSURE CONTROL IN WHEELED VEHICLES

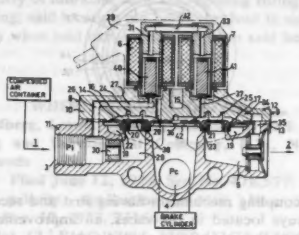
John Fritiof Rönnhult; Ernst Göran Estmar, both of Sodertalje, and Bjarne Louis Petersen, Jarna, all of Sweden, assignors to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed Apr. 17, 1975, Ser. No. 568,810

Claims priority, application Sweden, Apr. 22, 1974, 7405366

Int. Cl.² B60T 8/06, 15/02

U.S. Cl. 303—21 F 9 Claims




1. A valve unit having an inlet and an outlet, said unit being adapted to control braking pressure in at least one brake cylinder in a pneumatic braking system for wheeled vehicles, comprising a compressed air source;

said valve unit being mounted in a conduit between said compressed air source and said brake cylinder, and comprising at least one solenoid valve means, an inlet valve means and an outlet valve means which, under the action of said solenoid valve means are regulated by signals from an electronic braking control system to regulate the air flow entering and leaving the brake cylinder, said valve unit, during a pressure increase sequence, being fed with pulses of constant length to develop a stepwise pressure increase in the brake cylinder by opening and closing the inlet valve means;

said inlet valve means comprising a regulating chamber;

said solenoid valve means being adapted to selectively place said chamber in communication with either the valve unit inlet or with the valve unit outlet to the ambient atmosphere, characterized in that the inlet valve means further includes a diaphragm and a valve seat, said diaphragm being biased by the pressure in the regulating chamber into sealing engagement with the valve seat to close the first valve means, and being biased on the opposite side thereof by both the inlet pressure and the brake cylinder pressure to open said first valve means, the valve seat being adapted to expose a first portion of the diaphragm to inlet pressure and a second portion adjacent said first portion to the brake cylinder pressure, the ratio between the areas of the inlet valve means diaphragm affected by the respective pressures being selected in such a way that the inlet valve means raises the brake cylinder pressure towards the pressure level of said compressed air source in essentially constant steps, independently of the initial value of the pressure to be changed.

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3,977,735

## VEHICLE BRAKE PROPORTIONING MECHANISM

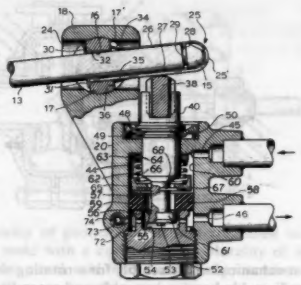
John W. Bush, New Baltimore, and Michael J. Denholm, Owosso, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 414,569, Nov. 9, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 554,882

Int. Cl.² B60T 8/22

U.S. Cl. 303—22 R 23 Claims

1. In a braking system with a master cylinder having front and rear pressure chambers for a vehicle having sprung and unsprung masses, said unsprung mass comprising front and rear wheels and braking means therefore, brake pressure proportioning valve means in said system comprising a body with a plurality of parallel bores, each having inlet and outlet ports, means selectively connecting said inlet and outlet ports to certain of said chambers and with said front and rear braking means respectively, said valve body being mounted on one of said masses, a piston in each of said bores for proportioning



braking pressures between inlet and outlet ports, and means for impressing a loading force upon said pistons operatively connected to said rear wheel braking means for loading said pistons in accordance with the weight supported by said rear wheels including an equalizer bridging all of said pistons and yieldable load means extending between said rear axle structure and said equalizer.

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3,977,736

## RECTILLINEAR GUIDE DEVICE

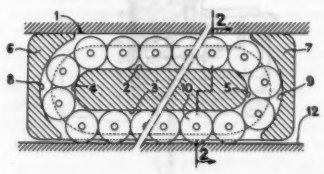
Alfred Pitner, Paris, France, assignor to Nadella, France, a part interest

Filed May 14, 1975, Ser. No. 577,205

Claims priority, application France, May 17, 1974, 74.17350

Int. Cl.² F16C 29/06

U.S. Cl. 308—6 C 7 Claims



1. In a bearing structure for guiding two parts undergoing a relative movement of translation comprising means defining a body, a first linear raceway on the body, rolling elements rollingly engaging said raceway and capable of rollingly contacting a rolling surface of one of said parts, a second linear raceway parallel to the first raceway on the body, two circularly-shaped passages interconnecting the first and second raceways for the recirculation of the rolling elements, the improvement comprising forming the first linear raceway with a convex transverse profile which profile differs from the profile of the generatrices of the rolling elements so that there is a point contact between said convex transverse profile and the rolling elements.

3,977,737

## SEAL ASSEMBLY FOR ROTATING SHAFT

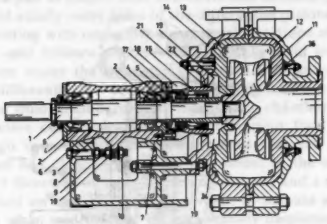
Anthony Grzina, Artarmon, Australia, assignor to Warman International Limited, Artarmon, Australia

Filed June 17, 1975, Ser. No. 587,624

Claims priority, application Australia, June 20, 1974, 7915/74

Int. Cl.[2] F01C 9/00, 33/72; F16J 9/12

U.S. Cl. 308—36.2 4 Claims



1. A mechanical seal assembly for a rotating shaft having an axially adjustable bearing assembly and extending into a pressure vessel through an opening in the latter; the seal assembly comprising a first seal face on said shaft and being rotatable therewith; a stationary second seal face in a seal housing and cooperating with said first seal face; said housing being rigidly attached to said bearing assembly to pass through said opening in the pressure vessel; and sealing means in said opening to maintain a sealing relationship between said pressure vessel and said housing.

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3,977,738

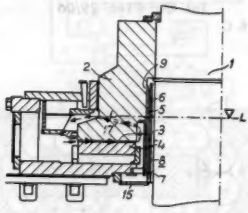
## SUPPORTING BEARING

Arne Sundstrand, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Aug. 21, 1975, Ser. No. 606,595

Int. Cl.[2] F16C 1/24

U.S. Cl. 308—134.1 1 Claim



1. Supporting bearing means for a rotary vertical shaft (1) comprising a supporting bearing member (2+7) attached to the shaft and arranged coaxially with respect to said shaft, said supporting bearing member having an inner cylindrical surface arranged with a radial clearance with respect to the shaft and a downwardly-facing, annular slide face (3) bearing against at least one stationary bearing body (4), said cylindrical surface surrounding an annular space (5) which contains liquid lubricant and a stationary screen (8) surrounding the shaft and forming an inner limiting wall of said space, said screen comprising an inner hollow cylinder (11) and an outer hollow cylinder (10) arranged coaxially with respect to said inner hollow cylinder (11) and with a radial clearance with respect to it, said outer hollow cylinder (10) being provided with a plurality of through holes directed towards said cylindrical surface.

3,977,739

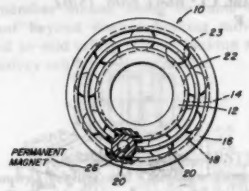
## MAGNETIC BALL BEARING ASSEMBLY USING FERROLUBRICANTS

Ronald Moskowitz, Merrimack, N.H., and Wesley C. Howe, Waltham, Mass., assignors to Ferrofluidics Corporation, Burlington, Mass.

Filed Sept. 6, 1974, Ser. No. 503,877

Int. Cl.[2] F16C 19/06, 33/32, 33/34, 33/58

U.S. Cl. 308—187 3 Claims




1. In a coupling mechanism having first and second races and raceways located in the races, an improvement to the lubrication of the mechanism comprising:

permanently magnetized rolling elements positioned in the raceways for rolling contact therewith, to permit rotation of the races relative to one another;

the magnetized elements further producing a magnetic field within the mechanism, flux density being maximized at wear surfaces, defined at contact points between the elements and the raceways; and

ferrolubricant material in the mechanism and entrained at the contact points by the magnetic influence of the maximized flux density.

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3,977,740

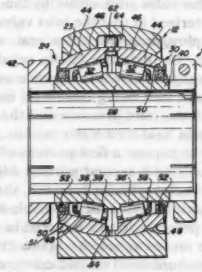
## ROLLER BEARING IMPROVEMENT

Hilarius S. Struttmann, Ithaca, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 13, 1974, Ser. No. 523,393

Int. Cl.[2] B21D 53/12; B21K 1/02; F16C 27/04

U.S. Cl. 308—194 10 Claims



1. A method of making a roller bearing cartridge having an inner race with spaced raceways and a two part outer race, each with a raceway, and rows of rollers, each row of rollers contacting the adjacent raceways of the inner and outer races, said cartridge being adapted for use with a housing having an opening for the cartridge and a lubrication fitting and a cavity communicating with the opening, which method comprises;

forming two halves of the outer bearing race each with an arcuate outer surface and a frusto-conical inner surface defining a raceway and a edge having a plurality of semicircular slots or openings therein, one of said openings being diametrically opposed to another of said openings and a third opening intermediate the opposed openings;

assembling said halves with the opposed openings of one of said halves and the opposed openings of the other of said halves arranged to form a pair of circular openings diametrically opposed to one another and a pair of spaced semi-circular openings;

inserting a pair of rows of roller bearings and an inner race between said halves; inserting a locking pin in one of said circular openings; and

joining the so assembled halves to form said cartridge;

said cartridge being adapted to be placed in a housing opening, one of resultant openings in said outer race providing for entry of lubricant from said housing fitting when in a housing, said locating pin being received in said housing cavity when said cartridge is placed in said housing.

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**3,977,741**

## WHEEL BEARING ASSEMBLY

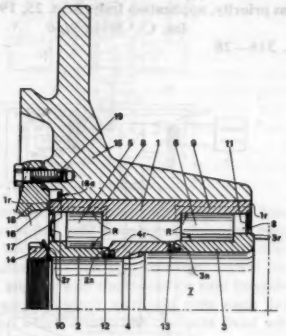
**Sten Lundberg, Lerum, Sweden, assignor to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands**

**Filed June 12, 1974, Ser. No. 478,577**

**Claims priority, application Sweden, June 27, 1973, 7309020; Dec. 10, 1973, 7316610**

**Int. Cl.[2] F16C** *19/04, 33/60, 33/78, 35/06*

**U.S. Cl. 308—207 R** **6 Claims**



1. In a bearing assembly for use between a shaft and a wheel hub, including the components, inner and outer race rings with corresponding inner and outer ring raceway surfaces respectively defining two axially spaced raceways and a plurality of rolling elements in said raceways, the improvement in combination therewith wherein said inner race ring comprises first and second inner ring elements axially spaced apart, each of which includes one of said inner ring raceway surfaces, and a spacer sleeve between and axially aligned with said first and second inner ring elements, and fastening means engaging only the inner ring elements and the spacer sleeve for maintaining said first and second inner ring elements in fixed axial relationship with said spacer sleeve and for maintaining all of said components together as an assembly independent of said shaft and wheel hub.

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**3,977,742**

## ASSEMBLABLE STRUCTURE FOR SHELVES AND THE LIKE

**Giuseppe Rovere, via Cornello Rovera 63, Gavirate (Varese), Italy**

**Filed May 5, 1975, Ser. No. 574,521**

**Claims priority, application Italy, Sept. 6, 1974, 5172/74**

**Int. Cl.[2] A47B** *47/00;* **F16B** *12/00*

**U.S. Cl. 312—111** **9 Claims**

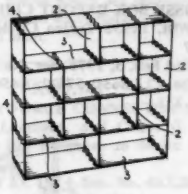
1. Assemblable, multi-component structure for libraries and the like, which comprises:

a plurality of panels having first and second surfaces and edges therebetween, said surfaces being opposed to each other and said edges being opposed in pairs;

a first plurality of depression isolated from each other and spaced apart along at least one edge of said first surface;

a second plurality of depressions isolated from each other and spaced apart along the edge of said second surface opposite said one edge;

a plurality of elongated connecting ribs for connecting said panels to one another;



a first plurality of protrusions in said rib, sized so as to forcedly mate with a corresponding plurality of depressions in one panel, said first plurality of protrusions being isolated from each other and spaced apart along the length of said rib; and

a second plurality of protrusions in said rib, sized so as to forcedly mate with a corresponding plurality of depressions in another panel contiguous to said one panel, said second plurality of protrusions being isolated from each other and spaced along the length of said rib.

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**3,977,743**

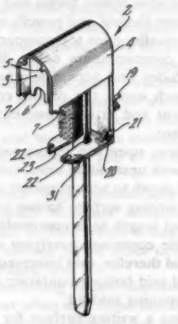
## COMBINATION WALL-MOUNTED TOOTHBRUSH HOLDER AND CARRYING CASE

**John Madison Harris, P.O. Box 2819, West Palm Beach, Fla. 33402**

**Filed Sept. 29, 1975, Ser. No. 617,684**

**Int. Cl.[2] A46B** *17/00*

**U.S. Cl. 312—207** **1 Claim**



1. A toothbrush holder for keeping toothbrush bristles clean, comprising an L-shaped holder having an upstanding back portion and a bottom portion, said bottom portion being fixed to said upstanding back portion and extending therefrom to a free end, said bottom portion having a slot therein extending from its free end towards said upstanding back portion for receiving the handle of a toothbrush, said holder including a cover pivotally mounted on the top of said upstanding back portion and adapted to swing downwardly and encompass the brush portion of a toothbrush, said cover having projection means for securing said cover in a closed position on said L-shaped holder, the inside of said cover having a flat tongue-like projection that closes off the forward portion of the slot

at the free end of the bottom portion of the L-shaped holder when said cover is closed, the upstanding back portion of the L-shaped having fastening means on its back located away from said bottom portion for engaging a mounting bracket for said toothbrush holder, the free end of the tongue-like projection having a slot therein for mating with the closed end of the slot in said bottom portion for confining the handle of a toothbrush.

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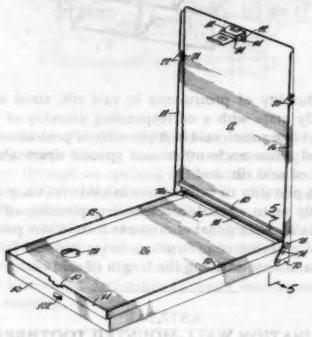
3,977,744

**POSSE BOX REPORT CLIP BOARD**

F. Carlos DeWitt, 14932 Trojan Circle, Huntington Beach, Calif. 92647

Filed Feb. 3, 1975, Ser. No. 546,706
Int. Cl.² B65D 57/00; A45C 11/34
U.S. Cl. 312—231 9 Claims



1. A three-part combination report clip board and storage container comprising:

an open top bottom container formed as a flat tray with upstanding sides, said container of a width, breadth and depth to receive report forms and pads in one open top compartment thereof and pencils or other writing instruments in a smaller open top compartment therein, the two open top compartments being divided by a partition which includes and access aperture for permitting the user to reach under the papers contained in the larger compartment and at least one buffer pad in the pencil compartment;

an intermediate, open top report pad container formed as a flat tray with upstanding sides, said container of a width, length and depth to accommodate a writing pad, said tray forming a writing surface having an upper flat surface of a width and length to accommodate a writing pad, said intermediate container overlying said bottom container to form a lid therefor, said intermediate container extending beyond said bottom container on at least one side to facilitate opening said lid;

means forming a writing surface for clipping a pad to the surface, down-turned flanges on the sides of the writing surface, said flanges forming at least one notch to retain in position an elastic paper retaining means across the writing surface but not around either of the containers, said writing surface means overlying said intermediate container to form a lid therefor, said writing surface means extending beyond said intermediate container on at least one side to facilitate opening said lid;

the lower container, intermediate container and writing surface being hinged together by a single axis hinge which includes a pair of hinge pins, the hinge being so constructed and configured as to pivotly position the intermediate tray above the lower tray and to pivotly position the writing surface above the intermediate tray, to permit the writing surface, when opening, to cross an over-center position to a position beyond the vertical plane, with respect to the plane of the bottom tray;

the intermediate tray having a rear lip with an in-turned ledge, a buffer pad sealer of resilient material affixed to the bottom side of the writing surface member to co-act with the rear lip structure to prevent small slips of paper from falling out through the hinge area;

latch means secured to the underside of the writing surface member extending over the intermediate tray selectively to secure the intermediate tray to the bottom of the writing surface or to release the intermediate tray to rest on the top of the bottom tray and means secured to the front end of the bottom tray to keep the latch in the closed position;

the flat tray of the intermediate container including an opening to permit the user to lift a pad from the tray by extending a finger or thumb through the opening; and

non-skid means on the outside of the bottom container.

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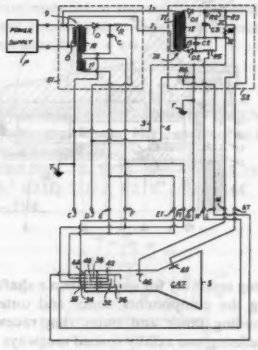
3,977,745

**APPARATUS FOR RESTORING CATHODE-RAY TUBES**

Enio DiCecco, and Mario Costante Totti, both of Milan, Italy, assignors to Safe Electronic Systems S.A., Mauren, Liechtenstein

Continuation-in-part of Ser. No. 395,344, Sept. 7, 1973, abandoned. This application May 15, 1975, Ser. No. 577,742
Claims priority, application Italy, Sept. 25, 1972, 29657/72
Int. Cl.² H01J 9/50
U.S. Cl. 316—28 5 Claims



1. An assembly for the regeneration of a cathode-ray tube for a TV-set and for the visual check of cathode conditions, said tube having pins two of which are connected to a filament and the other of which are respectively connected to a cathode, a grid, and first, focusing and main anodes, said assembly comprising a power supply, a first feeder and a second feeder series-connected with each other, said first feeder being directly connectable with said power supply and including a set of at least first, second, third and fourth terminals, the first terminal being grounded, said feeder being designed to apply a voltage in the range from 50 V to 5000 V to the second terminal, and to apply a voltage in the range of 6 to 12 V between the third and the fourth terminals, said second feeder being directly connected with said first and second terminals of said first feeder, said first feeder including a voltage source, said second feeder being connected with said voltage source, said second feeder comprising at least one set of first, second, third, fourth, fifth, sixth and seventh terminals, of which the first and second are directly connected with the third and fourth terminals of said first feeder, said second feeder being adapted to apply a voltage in the range of 0 V to −50 V to the

fourth terminal thereof, a voltage in the range from 150 V to 400 V to the fifth terminal thereof, a voltage in the range of 1000 V to 3000 V to the sixth terminal thereof, and in the range from 4000 V to 7000 V to the seventh terminal thereof, the third terminal of the second feeder being grounded, the third and fourth terminals of the first feeder and the first and second terminals of the second feeder being connectable to the pins connected to said filament, said first and said second terminals of said first feeder being connectable to said pins connected to said grid and said cathode, respectively, said third, said fourth, said fifth, said sixth and said seventh terminals of said second feeder being connectable to the pins connected to said cathode, said grid, said first anode, said focusing anode and said main anode, respectively.

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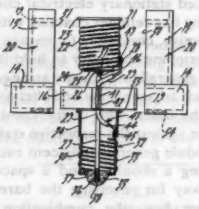
**3,977,746**

## OUTLET DEVICE

**Paul F. Seibold, 26665 York Road, Huntington Woods, Mich. 48070**

**Filed Jan. 31, 1973, Ser. No. 328,421**
**Int. Cl.² H01R *13/50***
**U.S. Cl. 339—32 R** **3 Claims**



1. In an electric outlet plug, an insulated housing, a threaded socket within said housing, a threaded plug below said housing, a socket having spaced slots for a pronged plug within said housing between said threaded socket and plug, said slots being aligned with the thread on said threaded plug, and spaced contacts aligned with said slots each having an L-shaped section which retains the contacts fixed within the chambers in insulated relation to each other.

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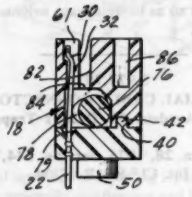
**3,977,747**

## ZERO INSERTION FORCE CONNECTOR

**Kamal Shawiky Broutros, Downsview, Canada, assignor to Bunker Ramo Corporation, Oak Brook, Ill.**

**Filed Oct. 10, 1974, Ser. No. 513,663**
**Int. Cl.² H01R *13/62*; H05K *1/07***
**U.S. Cl. 339—74 R** **9 Claims**



1. In an electrical connector of the type having a housing with a slot adapted to receive a circuit board and a plurality of circuit board engaging contacts which are mounted in said housing and moved with respect to the slot by a camming structure, the improvement wherein:

said camming structure comprises an elongate rotatable cam shaft and a plurality of cams carried on said cam shaft at positions spaced axially of said cam shaft for engaging and moving respective ones of said contacts, and

said housing includes a first part, and a second part connected to said first part at mating surfaces on each part, said first and second parts including surfaces for rotatably supporting said cam shaft which surfaces define a mounting chamber enclosing said shaft at said positions and include an elongate continuous surface on each part rotatably supporting said cam shaft at said axially spaced positions against forces which are generated by engagement of said cams and said contacts and which are applied to said cam shaft.

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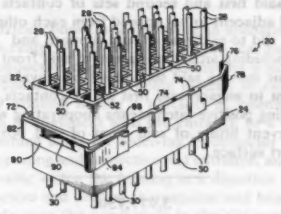
**3,977,748**

## ZERO INSERTION FORCE CONNECTOR ASSEMBLY

**William D. Gruhn, Lombard, and Cletus G. McDonough, Elmhurst, both of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Filed Apr. 23, 1974, Ser. No. 463,267**
**Int. Cl.² H01R *13/54***
**U.S. Cl. 339—75 M** **13 Claims**



1. A zero insertion force connector assembly including a pair of connector housings movable relative to one another in a first direction between a first position and a second position, a plurality of pairs of terminals, each pair including one terminal mounted on each housing, each terminal including one terminal mounted on each housing, each terminal including a contact structure projecting from its respective housing toward the other housing, the contact structures of each terminal pair being spaced from one another when said housings are in said first position and are adapted to move into electrical engagement when said housings are moved to said second position, the improvement in each pair of terminals comprising:

each contact structure being substantially identical and resilient, each contact structure including a generally planar front contact surface which is adapted to engage the front contact surface of the other contact structure, and two vertical edges; and

each terminal pair including means disposing said contact structures such that when said front surfaces engage, the net force exerted near one edge of one contact structure is greater than the net force exerted near the other edge producing simultaneous torsion of both contact structures and producing a line of electrical contact between the front surfaces.

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**3,977,749**

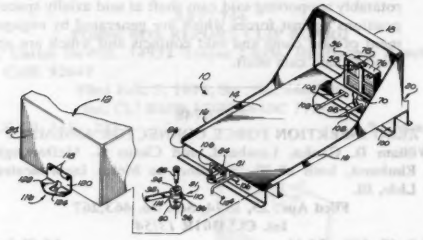
## ELECTRONIC PACKAGING ASSEMBLY

**Jack E. Langenbach, Newport Beach, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Jan. 29, 1975, Ser. No. 545,148**
**Int. Cl.² H01R *13/54***
**U.S. Cl. 339—75 M** **15 Claims**

1. An electronic packaging assembly comprising:

a generally flat stationary support having a front and a rear;
a box for containing electonic components slidable on the upper surface of said support from said front, said box having a front and a rear;
said support being void of structure restricting upward lifting of said box off of said upper surface;
a first set of contacts at said rear of said box;



a second set of movable contacts at said rear of said support, said first and second sets of contacts being positioned adjacent to but spaced from each other when said box is slid to said rear of said support; and
means including an actuating arm at said front of said support for moving said second set of movable contacts in tandem to engage said first set of contacts, said means including positive latch means cooperating with said box to prevent lifting of said front of said box off of said support surface.

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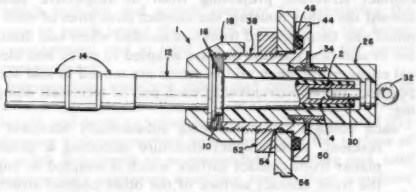
**3,977,750**

## RUGGEDIZED HIGH VOLTAGE CONNECTOR

**Douglas Wade Glover, Harrisburg, and Henry Otto Herrmann, Jr., Mount Joy, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Jan. 15, 1976, Ser. No. 649,380**
**Int. Cl.² H01B** *17/26*
**U.S. Cl. 339—89 R** **2 Claims**



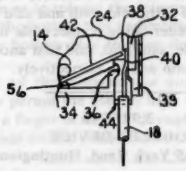
1. A flange connector, comprising:
a dielectric sleeve provided with an outer annular metal flange,
a conductive pin mounted to project into said dielectric sleeve,
a metal sleeve removably receiving said dielectric sleeve, said metal sleeve having an integral outer flange and an annular recess in said flange,
a conductive socket terminated to an electrical lead and enclosed within a dielectric cover, said socket removably receiving said pin and said cover removably received in said dielectric sleeve,
a threaded retainer means threadably received on said metal sleeve and retaining said cover in said dielectric sleeve, and
said annular metal flange being soldered in said annular recess.

**3,977,751**

## RELEASE MECHANISM FOR PLUG IN-TYPE TERMINALS

**Edward V. Sahrbacker, Brecksville, Ohio, assignor to Lucerne Products, Inc., Hudson, Ohio**

**Filed Dec. 20, 1974, Ser. No. 534,668**
**Int. Cl.² H01R** *9/08*
**U.S. Cl. 339—95 D** **4 Claims**



1. In an electrical switch mechanism for a portable type tool comprising a trigger-switch assembly, the latter including a module portion disposed within a switch housing, said switch module having spaced stationary electrical contacts thereon and including a spring like retainer coacting with each contact adapted when in active condition to engage an insertable conductor line for gripping the latter to hold it in place, said retainer including a generally diagonally arranges spring blade on said module which adjacent one end thereof is adapted to releasably engage the bared wire of the conductor line, for positioning the latter against the respective stationary electrical contact, said module generally adjacent each said stationary contact including a shoulder and a spaced lip portion defining a passageway for receiving the bared wire of the respective conductor line, the combination therewith of means mounted on said mechanism for selectively deactivating said blades to permit ready withdrawal of the conductor lines from coaction with the respective stationary contact, said deactivating means comprising a U-shaped pusher element having upstanding arms disposed in the associated of said passageways intermediate the respective shoulder and lip portion on the switch module, said element being slidable inwardly of said passageways so as to be engageable with the spring blades for moving the latter generally simultaneously out of gripping coaction with the respective bared wire to permit withdrawal of the conductor lines, the cross portion of said element disposed exteriorly of said switch housing exterior, means on the arms for coaction with the respective lip portion for retaining the pusher element in assembled relation with the switch mechanism, and including other means on the respective arm for limiting inward movement of said element with respect to said switch module, said arms being of sufficient length so that said cross portion of said pusher element is in spaced relation to said switch housing in all positions of said pusher element so as to be always oriented outwardly of said switch housing.

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**3,977,752**

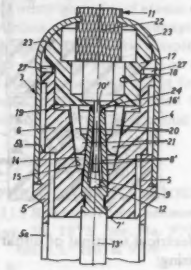
## COAXIAL CABLE CONNECTOR

**Wolfgang Freitag, Arndstr. 11, D-2351 Trappenkamp, Germany**

**Filed Jan. 28, 1975, Ser. No. 544,795**
**Int. Cl.² H01R** *17/04*
**U.S. Cl. 339—95 A** **13 Claims**

1. In an electrical connector for use with coaxial cables having inner and outer conductors of electrically-conductive material, the connector having an inner contact member which includes resilient fingers opposing one-another adapted to hold the inner conductor therebetween securably, an outer contact member, and a first insulating body separating and mounting the inner and outer contact members coaxially to one-another, said insulating body being shaped and adapted to define a tapering recess space with tapering walls thereof

converging radially inwardly toward said resilient fingers, insulating structure mounted on a terminal end of the coaxial cable, and pressure means mounted securably onto the insulating structure and providing pressure fingers opposing one-another adapted to be inserted into said tapering recess space into pressing contact with the tapering walls such that when



the pressure fingers become flexed radially inwardly as a result of being pressed against the tapering walls, the pressure fingers becomes pressed against said resilient fingers to flex thereby the resilient fingers inwardly to anchor and grasp the inner conductor, said outer contact member being adapted for connection to the outer conductor of the cable.

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**3,977,753**

## ELECTRICAL TERMINAL ASSEMBLY AND TERMINAL THEREFOR

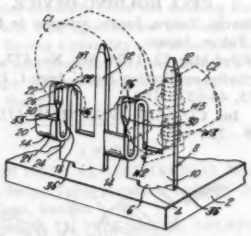
**Jacques Fournier, Marly le Roi, France, assignor to AMP Incorporated, Harrisburg, Pa.**

**Continuation of Ser. No. 469,997, May 15, 1974, abandoned. This application July 1, 1975, Ser. No. 592,309**

**Claims priority, application France, Feb. 21, 1974, 74.06008**

**Int. Cl.² H01R 9/08**

**U.S. Cl. 339—95 R** **2 Claims**



**1. An electrical terminal comprising a pair of parallel plates, said plates being generally contiguous and being connected by a bight, a wire guiding mouth formed in said bight, and a wire receiving slot formed in each said plate and communicating with said mouth, said slots having gripping portions offset relative to each other and having an overlapping area, said slot gripping portions being substantially parallel to each other, with said overlapping area extending the entire depth of said slots, said plates being connected resiliently by the bight whereby the slots are moved more nearly into mutual alignment upon the insertion of a wire into both said slots by way of the mouth.**

**3,977,754**

## ELECTRICAL CONNECTOR

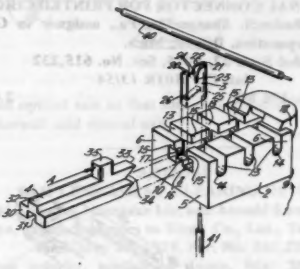
**Wilhelmus Johannes Brummans, Sint-Michielsgestel, Netherlands, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Dec. 5, 1974, Ser. No. 530,269**

**Claims priority, application Netherlands, Dec. 19, 1973, 7317390**

**Int. Cl.² H01R 9/08**

**U.S. Cl. 339—99 R** **5 Claims**



**2. An electrical connector comprising an insulating housing having a plurality of transversely spaced cavities formed therein, a conductive contact member having a slot therein, one of said contact members being located in each of said cavities, said housing having a plurality of openings therethrough each in alignment with the entrance to a respective slot, each opening being for receiving a conductor extending through the opening and respective slot entrance, and a stuffer element movable within the housing in a direction tangential to the conductors and bearing thereagainst and being successively movable over the conductors in the slot entrances for forcing the conductors into firm electrical contact with their respective slot wall.**

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**3,977,755**

## SCREENING ARRANGEMENT FOR A MULTI-PIN CABLE CONNECTOR

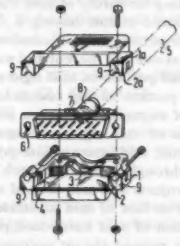
**Bernhard Edel, Unterpfaffenhofen, and Gerhard Pierer, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Aug. 15, 1975, Ser. No. 605,183**

**Claims priority, application Germany, Aug. 30, 1974, 2441669**

**Int. Cl.² H01R 23/06**

**U.S. Cl. 339—143 R** **8 Claims**



**1. A multi-pin cable connector comprising:**

**a housing formed of synthetic material and including a pair of mating halves and a metal pin connector base for being secured within the housing, said metal pin connector base having means for being coupled to a multi-wire cable having an associated cable screen, each of the internal walls of said mating halves having a metal liner and a metal bracket, said metal brackets of respective halves of**

said housing being arranged to clamp the cable screen therebetween wherein the housing halves are assembled, said metal brackets, liners, and pin base being associated together within the housing to form low-ohmic contacts between each of said brackets, liners and pin base.

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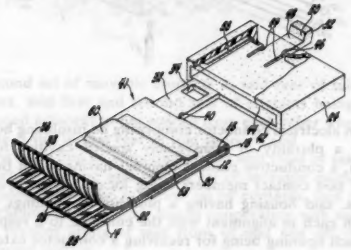
3,977,756

## TRANSITIONAL CONNECTOR FOR PRINTED CIRCUITS

Andrew F. Rodondi, Sharpsville, Pa., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 22, 1975, Ser. No. 615,232
Int. Cl.² H01R *13/54*
U.S. Cl. 339—176 MF 2 Claims



1. A transitional connector for connecting flexible and hardboard printed circuit comprising,

a unitary cap of moldable rigid dielectric material having a rearward transverse slot opening into a cavity and a forward slot of reduced transverse dimension exiting from said cavity, said cap having a longitudinal, forwardly projecting finger which has a latch shoulder spaced forwardly of and aligned with said forward slot, said finger being resiliently deflectable in a transverse direction,

a hardboard printed circuit comprising a rigid nonconductive substrate having an end portion with conductor portions on a surface thereof which terminate adjacent a transverse edge thereof, said rigid substrate having a longitudinal latch portion of reduced transverse dimension projecting forwardly of said transverse edge,

A flexible printed circuit having a first end portion, an intermediate portion and a second end portion which are continuous at one end thereof and wrapped longitudinally about the end portion of said rigid substrate,

said first end portion having conductor portions on a surface thereof engaging respective conductor portions on said surface of said rigid substrate of said hardboard printed circuit, said intermediate portion having a transverse slot through which the latch portion of the rigid substrate projects and said second end portion engaging an opposite surface of said substrate,

said end portion of said hardboard printed circuit having said flexible printed circuit portions wrapped longitudinally thereabout being disposed in the cavity of said cap via said rearward transverse slot, said latch portion of said rigid substrate projecting through said forward slot and engaging said latch shoulder of said resiliently deflectable finger to prevent withdrawal of said rigid substrate, and

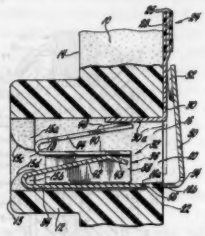
elastomeric means disposed in said cap and engaging said flexible printed circuit for biasing said conductor strip portions into intimate contact.

3,977,757

## WIPE-IN FEMALE TERMINAL FOR PRINTED CIRCUITS

John A. Yurtin, Warren, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 17, 1975, Ser. No. 559,030
Int. Cl.² H01R *9/08*
U.S. Cl. 339—217 S 8 Claims



1. A female electrical terminal of unitary sheet metal construction comprising:

a generally planar body portion having a forward end and a rearward end,

a box-like portion for receiving a male terminal, said box-like portion comprising side walls which are contiguous respectively with laterally spaced sides of the body portion and which have inturned lateral flanges at their free ends,

a first resilient tongue at least partially disposed in said box-like portion for biasing a male terminal received in said box-like portion against an interior surface thereof, and

a second resilient tongue having a forward inclined portion which is at least partially disposed outwardly of said box-like portion and which extends rearwardly and outwardly with respect to said body portion from a reverse bend portion located forward of said box-like portion whereby the female electrical terminal is adapted to make electrical connection with a printed circuit by wiping an overhanging flexible conductor strip of a printed circuit into a cavity of a rigid panel carrying the printed circuit when the terminal is inserted into the cavity.

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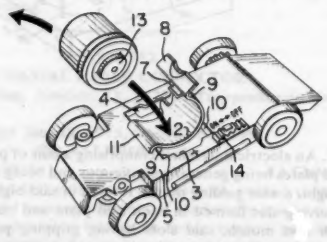
3,977,758

## CELL HOLDING DEVICE

Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed May 23, 1974, Ser. No. 472,519
Claims priority, application Japan, June 1, 1973, 48-62138; June 1, 1973, 48-65253[U]
Int. Cl.² A63H *29/22*; H01R *13/24*
U.S. Cl. 339—224 5 Claims




1. A device for holding an electric cell, comprising a cell receiving space having an opening large enough to receive the cell and having spaced opposite edges, and an elastic clasping member adapted to clasp the cell, said elastic clasping member having engaging portions to engage said edges of the cell

receiving space, the spacing between one of the engaging portions arranged to contact one of the edges of the cell receiving space and the other of the engaging portions arranged to contact the other of the edges, being, when no elastic deformation exists, greater than the spacing between said edges of the cell receiving space, one end of said elastic clasping member being swingably secured to one of the said edges of the cell receiving space and the other end of the same being adapted to engage the other of the said edges of the cell receiving space, said other end of said elastic clasping member including a wing portion arranged to engage said other edge of the cell receiving space, said elastic clasping member being in electrical contact with one electrode of the cell which it clasps, said elastic clasping member being further adapted to be in electrical contact, when it has been fitted in the cell receiving space, with one electrical terminal of a driving motor.

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**3,977,759**

## TERMINAL FOR WIRES OF VARIOUS GAUGES

**Paul A. Maximoff, 115 Brixham Place, Schaumberg, Ill. 60172**

**Filed Apr. 28, 1975, Ser. No. 572,230**
**Int. Cl.² H01R *9/06***
**U.S. Cl. 339—275 B** **5 Claims**

1. An electrical connector for receiving an electrical lead, said connector comprising an elongated tubular housing having a solder receiving section and a substantially closed end contiguous with an electrical lead receiving section having an open end, which open end receives the lead, an integral continuous ring formed intermediate the ends of said housing; a resilient arm bent inwardly from the housing for biasing the received electrical lead against said housing, said solder receiving section having a plurality of portions struck from said housing each of said portions forming at least a substantially pentagonal shape and bent inwardly for providing openings for solder flow thereinto.

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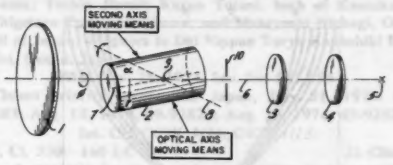
**3,977,760**

## DEVICE FOR OPTICAL-MECHANICAL SCANNING

**Stig Leopold Ullstig, Taby, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden**

**Filed Feb. 11, 1975, Ser. No. 548,917**
**Claims priority, application Sweden, Feb. 14, 1974, 7401986**
**Int. Cl.³ G02B *27/17*; H01J *3/14***
**U.S. Cl. 350—6** **5 Claims**

1. A device for optical-mechanical scanning having an optical axis, said device including:
- detecting means located at a first position on said optical axis to receive and detect radiation;
- rotating refracting optical means located at a second position on said optical axis, said optical means having a pair of mutually parallel sides and a first axis normal to said parallel sides, said optical means being mounted with said first axis displaceable from said optical axis;
- means for rotating said optical means about said optical axis;
- and means for oscillating said optical means through a limited angular amount about a second axis orthogonal to said optical axis so that said pair of parallel sides always intersect said optical axis.

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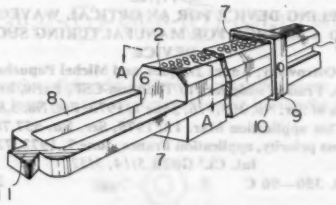
**3,977,761**

## BAR LENS ARRAY CLEANING DEVICE

**Motoaki Kawazu; Masataka Ide, and Atsushi Kawamura, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan**

**Filed May 27, 1975, Ser. No. 581,237**
**Claims priority, application Japan, May 28, 1974, 49-60381[U]**
**Int. Cl.² G02B *11/04, 5/14***
**U.S. Cl. 350—61** **7 Claims**



1. In a light transmission device having a plurality of elongated light transmitting members joined together in a row, the combination therewith of:
- a cleaning material; and
- means for guidably producing relative movement between the cleaning material and the light transmitting members in the row direction so that the cleaning material contacts the end faces of the light transmitting members to clean the end faces of the light transmitting members.

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**3,977,762**

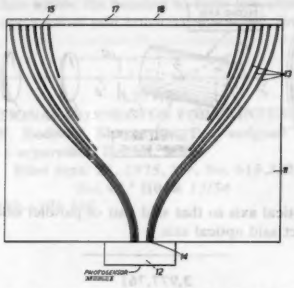
## OPTICAL COUPLER

**Carl Peter Sandbank, Bishop's Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Sept. 5, 1974, Ser. No. 503,217**
**Int. Cl.² G02B *5/14***
**U.S. Cl. 350—96 WG** **1 Claim**

1. An optical waveguide coupler for transferring light from an object at one end to a light responsive element at an opposite end comprising:
- a glass substrate;
- a layer of glass on the surface of said substrate, said glass layer having a higher index of refraction than said substrate glass;
- a plurality of optical waveguides on said substrate, said waveguides formed from said high index glass and separated from each other by a series of channels etched through said glass layer and into said substrate, said channels providing a series of equi-spaced intervals, each of said waveguides immediate a pair of said intervals;
- said intervals at said opposite end of said coupler being spaced closer together than at said one end of said cou-

pler to direct light from a surface area proximate said one end to a corresponding smaller surface at said opposite end; and



a stepped channel formed at said one end of said coupler extending parallel to said one end and perpendicular to said waveguides, said stepped channel thereby separating the end of said waveguides proximate said one end from any object positioned at said one end of the coupler.

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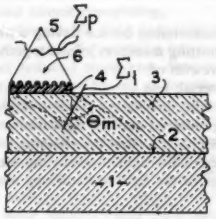
**3,977,763**

## COUPLING DEVICE FOR AN OPTICAL WAVEGUIDE AND A METHOD FOR MANUFACTURING SUCH A DEVICE

**Daniel Ostrowsky; André Jacques, and Michel Papuchon, all of Paris, France, assignors to Thomson-CSF, Paris, France**

**Division of Ser. No. 365,976, June 1, 1973, Pat. No. 3,885,856. This application Mar. 12, 1975, Ser. No. 557,781**
**Claims priority, application France, June 7, 1972, 72.20423**
**Int. Cl.² G02B *5/14, 5/32***
**U.S. Cl. 350—96 C** **2 Claims**



**1. A coupling device for a plane optical waveguide capable of conjugating a non plane electro-magnetic wave propagating outside said waveguide and a substantially plane electro-magnetic wave propagating at an angle inside said waveguide, said device comprising at least one hologram arranged on a face of said waveguide, said hologram being recorded in a material having a refractive index greater than the refractive index of said waveguide.**

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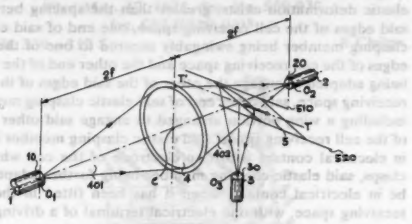
**3,977,764**

## VARIABLE COUPLER FOR OPTICAL FIBERS

**Luigi d'Auria; Benoit Le Guen, and Erich Spitz, all of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Sept. 8, 1975, Ser. No. 611,252**
**Claims priority, application France, Sept. 13, 1974, 74.31151**
**Int. Cl.² G02B *5/14***
**U.S. Cl. 350—96 C** **7 Claims**

**1. A variable coupler for optical fibres, for distributing the radiation issuing from the orifice of a first fibre, between the orifices of a second and a third fibre, and comprising optical focussing means for projecting a first image of said orifice of said first fibre, onto said orifice of said second fibre, and radiation pick-off means co-operating with at least part of said optical focussing means for projecting a second image of said orifice of said first fibre, onto said orifice of said third fibre; said radiation pick-off means being movable by translation for intercepting a fraction variable between 0 and 1 of said radiation issuing from said orifice of said first fibre.**



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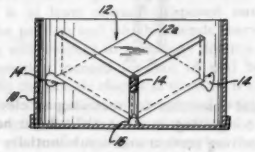
**3,977,765**

## HOLLOW RETROREFLECTOR MOUNT

**Morton S. Lipkins, 3 Nemeth St., Malverne, N.Y. 11565**

**Filed May 17, 1974, Ser. No. 470,991**
**Int. Cl.² G02B *5/122***
**U.S. Cl. 350—102** **8 Claims**



**1. A hollow retroreflector assembly including a retroreflector formed of three plates having flat reflecting faces meeting each other at right angles and each of said plates meeting the other two of said plates at respective junctions thereby constituting three junctions extending at right angles to each other, a support structure for supporting said retroreflector, and means for supporting said retroreflector on said support structure, said supporting means being confined to the proximity of said junctions, for limiting the retroreflector-supporting forces essentially to the planes of the three plates.**

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**3,977,766**

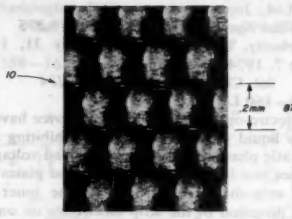
## PROJECTION SCREEN AND APPARATUS FOR THE FABRICATION THEREOF

**Harold F. Langworthy, and Robert N. Wolfe, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 24, 1975, Ser. No. 571,124**
**Int. Cl.² G03B *21/60;* B21D *3/06***
**U.S. Cl. 350—127** **11 Claims**

**1. In a projection screen of the type having a plurality of rows of alternately concave and convex optical microelements which are contoured to redistribute incident radiation uni-**

formly throughout a predefined solid audience angle, the improvement wherein both the length and amplitude of abut-




ting microelements in each row changes while the amplitude to length ratio remains constant.

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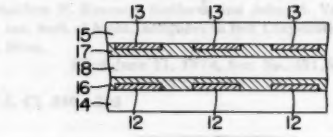
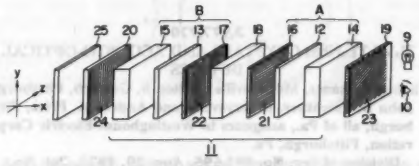
3,977,767

## ELECTRO-OPTICAL CELL

Yoshihisa Okuma, Tokyo; Takashi Toida, Chiba, and Ichiro Tsunoda, Kawasaki, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan

Filed July 21, 1975, Ser. No. 597,487
Claims priority, application Japan, July 23, 1974, 49-84346
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC 14 Claims




1. An electro-optical cell comprises, on an optical path: front and back electrode base plates each comprising a transparent base plate having an inner surface, an electrode film provided on said inner surface, and an optically active poly-α-amino acid film provided on said inner surface over the electrode film and orientated in one direction intersecting the orientated direction of the poly-α-amino acid film of the other electrode base plate as viewed along the optical path, the electrode base plates being disposed with the inner surfaces of their base plates in mutually facing state; and a nematic liquid crystal substance having a positive dielectric anisotropy and interposed between the front and back electrode base plates.

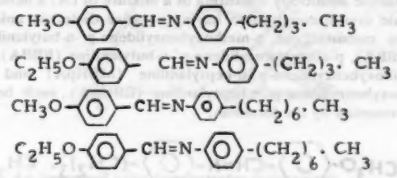
3,977,768

## NEMATIC LIQUID CRYSTAL COMPOSITIONS

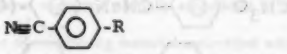
Kenji Nakamura, Kamakura; Mashachika Yaguchi, Yokohama; Toshio Jinnai; Kazuo Totani, both of Kamakura; Shigetaro Furuta, Fujisawa, and Masayoshi Nichogi, Oiso, all of Japan, assignors to Dai Nippon Toryo Kaubshiki Kaisha, Osaka, Japan

Filed Nov. 25, 1974, Ser. No. 527,096
Claims priority, application Japan, July 31, 1974, 49-87083; Aug. 15, 1974, 49-92821; Aug. 15, 1974, 49-92822
Int. Cl.² C09K 3/34; G02F 1/13
U.S. Cl. 350—160 LC 21 Claims

1. A nematic liquid crystal composition having positive dielectric anisotropy consisting of a mixture of a nematic liquid crystal composition having negative dielectric anisotropy consisting of p-methoxybenzylidene-p'-n-butylaniline (MBBA), p-ethoxybenzylidene-p'-n-butylaniline (EBBA), p-methoxybenzylidene-p'-n-heptylaniline (MBHpA) and p-ethoxybenzylidene-p'-n-heptylaniline (EBHpA), each being represented by the formulae,




and positive dielectric anisotropy-imparting agent selected from at least one p-n-alkylcyanobenzene having the formula,

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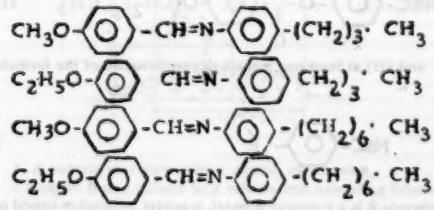
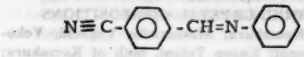
wherein R is a n-propyl, n-butyl, n-pentyl, n-hexyl, n-heptyl or n-octyl group, a weight ratio of said nematic liquid crystal composition having negative dielectric anisotropy to said positive dielectric anisotropy-imparting agent being within the range of 97.3 to 93.7.

8. A nematic liquid crystal composition having positive dielectric anisotropy consisting of a mixture of a nematic liquid crystal composition having negative dielectric anisotropy consisting of p-methoxybenzylidene-p'-n-butylaniline (MBBA), p-ethoxybenzylidene-p'-n-butylaniline (EBBA), p-methoxybenzylidene-p'-n-heptylaniline (MBHpA) and p-ethoxybenzylidene-p'-n-heptylaniline (EBHpA), each being represented by the formulae,

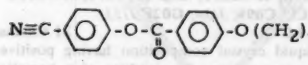



and positive dielectric anisotropy-imparting agent consisting of a mixture of p-cyanobenzylideneaniline having the formula,



II

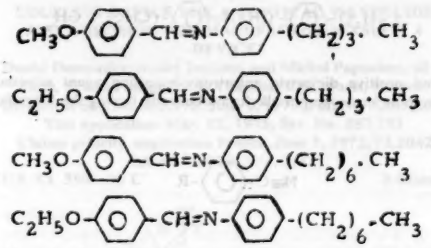
and p-cyanophenyl p'-n-octyloxybenzoate having the fomula,



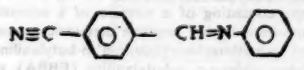
III

in the weight ratio of II to III of from 7:3 to 3:7, a weight ratio of said nematic liquid crystal composition having negative dielectric anisotropy to said positive dielectric anisotropy-imparting agent being within the range of 3:1 to 19:1.

**15.** A nematic liquid crystal composition having positive dielectric anisotropy consisting of a mixture of (A) a nematic liquid crystal composition having negative dielectric anisotropy consisting of p-methoxybenzylidene-p'-n-butylaniline (MBBA), p-ethoxybenzylidene-p'-n-butylaniline (EBBA), p-methoxybenzylidene-p'-n-heptylaniline (MBHpA) and p-ethoxybenzylidene-p'-n-heptylaniline (EBHpA), each being represented by the formulae,

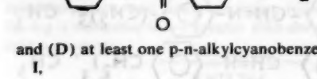


and positive dielectric anisotropy-imparting agent consisting of a mixture of (B) p-cyanobenzylideneaniline of the formula II,



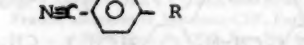
II

(C) p-cyanophenyl p'-n-octyloxybenzoate of the formula III,



III

and (D) at least one p-n-alkylcyanobenzene of the formula I,



I

wherein R is a n-propyl, n-butyl, n-pentyl, n-hexyl, n-heptyl or n-octyl group, a weight ratio of (A) liquid crystal composition having negative dielectric anisotropy to (B) + (C) being within the range of 3:1 to 19:1, a weight ratio of (B) to (C) being within of 7:3 to 3:7, and a weight ratio of (A) + (B) + (C) to (D) being within the range of 93:7 to 97:3.

## 3,977,769

## ELECTRO-OPTIC DEVICE

**Masahide Tsukamoto, Neyagawa; Tetsuro Ohtsuka, Takatsuki; Kazuhisa Morimoto, Settu, and Yoshinobu Murakami, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

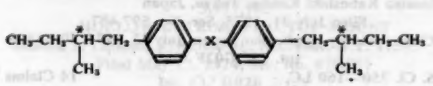
**Filed Apr. 22, 1975, Ser. No. 570,375**

**Claims priority, application Japan, May 31, 1974, 49-62343; June 7, 1974, 49-65286**

**Int. Cl.² G02F 1/13; C09K 3/34**

**U.S. Cl. 350—160 LC** **5 Claims**

**1.** In an electro-optical matrix display device having a cell containing a liquid crystal composition exhibiting a cholesteric to nematic phase transition upon applied voltage, which cell comprises two light-transparent opposed plates having a plurality of strip-shaped electrodes on the inner surfaces thereof, the direction of the strip electrodes on one of said plates intersecting that of the strip electrodes on the other said plate so as to provide a plurality of display elements at the intersections, the strip electrodes on at least one of said inner surfaces being transparent, and a spacer between said opposed electrodes; and a power supply coupled to said electrodes for applying an electric voltage to said electrodes, the improvement wherein the liquid crystal composition in said cell between said electrodes comprises 99.95 to 65 wt.% of at least 1 nematic liquid crystal and 0.05 to 35 wt.% of at least one optically active compound having two identical optically active side chains and having the formula:



wherein X is —N=N— or

## 3,977,770

## $Tl_3VS_4TL_2NbS_4$ CRYSTALS AND ACOUSTO-OPTICAL DEVICES

**Thelma J. Isaacs, Monroeville; Milton S. Gottlieb, Pittsburgh; John D. Feichtner, Murrysville, and Andrea A. Price, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 392,695, Aug. 29, 1973, Pat. No. 3,929,976. This application Sept. 22, 1975, Ser. No. 615,639**

**Int. Cl.² G02F 1/11; H03H 9/30; H01L 41/08**

**U.S. Cl. 350—161** **19 Claims**

**1.** A method of diffracting light comprising passing said light through two parallel optical faces of a a single crystal selected from the group consisting of $Tl_3VS_4$, $Tl_3NbS_4$, and non-conducting mixtures thereof, while generating a sound wave at a diffracting angle to said light in said single crystal said light being in the transparency range of said crystal and said crystal being at least about $10^{-3}$ cm. wide and 1 mm. long.

**19.** An acoustic delay line comprising:

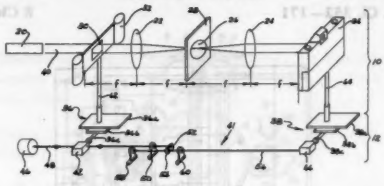
1. a single crystal selected from the group consisting of $Tl_3VS_4$, $Tl_3NbS_4$, and non-conducting mixtures thereof;
2. means for generating a sound wave in said crystal; and
3. means for detecting said sound wave after it has traversed said crystal.

3,977,771

## OPTICAL NOISE SUPPRESSION DEVICE AND METHOD

Joseph L. Horner, Cambridge, Mass., assignor to The United States of America as represented by the Administrator of the United States National Aeronautics and Space Administration, Washington, D.C.

Filed June 30, 1975, Ser. No. 591,568
Int. Cl.² G02B 27/38
U.S. Cl. 350—162 SF 23 Claims



20. A method of suppressing optical noise in an optical system, wherein an output device is detecting information from an input device by way of said optical system, comprising the steps of:

a. moving said input device perpendicularly to the optic axis of the optical system;

b. simultaneously moving said output device along a path parallel to that of the movement of said input device; and

c. synchronizing said motions of said input device and said output device so that the ratio of the speed of said output device to the speed of said input device is equal to the overall magnification of the optical system.

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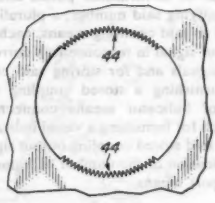
3,977,772

## APODIZED OPTICAL SYSTEM

Matthew P. Rimmer, Bedford, and John M. Vanderhoff, Acton, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Filed June 21, 1974, Ser. No. 481,588
Int. Cl.² G02B 5/00
U.S. Cl. 350—205 5 Claims




1. A telescopic optical system for forming an image of interest of an object of interest which is only slightly angularly displaced in space from a second object which second object releases much greater intensity radiation than said object of interest, said optical system including:

a. means for pointing said optical system to view said object of interest such that said second object is not directly in the field of view of said optical system, but wherein radiation from said second object forms diffraction rings in the field of view and wherein said image of interest is positioned beyond the 100th diffraction ring, and;

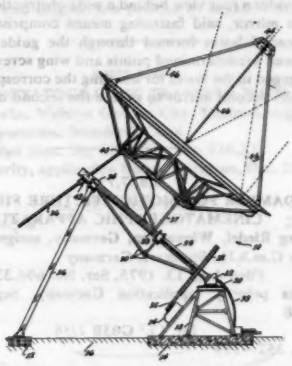
b. means for removing undesired diffracted radiation from said second object beyond said 100th diffraction ring, said removing means including means for modifying edges of the entrance aperture of said telescopic optical system to apodize the aperture of said telescopic optical system.

3,977,773

## SOLAR ENERGY CONCENTRATOR

Warren M. Hubbard, Chula Vista, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Jan. 17, 1975, Ser. No. 541,836
Int. Cl.² G02B 5/08; F24J 3/02
U.S. Cl. 350—292 14 Claims



1. An improved solar concentrator comprising:

a base member having an outer surface and an inner concave surface, said base member constructed of a polymerized resin;

a reflective means forming a portion of said concave surface, said reflective means comprising a plurality of side by side flat mirror segments partially embedded in said base member; and

at least one layer of reinforcing material embedded within said base member and positioned intermediate said surfaces.

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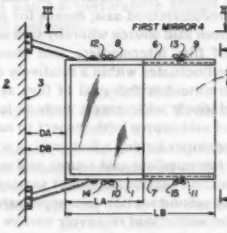
3,977,774

## VEHICLE REAR VIEW MIRROR WITH SLIDABLE PARALLEL SECTIONS

Bernard O'Sullivan, 120-31 DeKruif Place, Bronx, N.Y. 10475

Filed Jan. 30, 1975, Ser. No. 545,336
Int. Cl.² G02B 5/08
U.S. Cl. 350—304 2 Claims




1. A vehicle rear view mirror device, comprising

a support frame affixed to a vehicle and extending from a side thereof;

a first rear view mirror affixed to the frame at a predetermined distance from the side of the vehicle;

a second rear view mirror, said frame including a pair of spaced substantially parallel substantially coplanar guide members for guiding the second mirror in a plane sub-

stantially parallel to and adjacent that of the first mirror and said second mirror being slidably mounted in the guide members; and

fastening means for releasably affixing the second mirror to the frame in a first position in substantially parallel adjacent relation with the first mirror and in a second position at a distance greater than the predeterminedistance from the vehicle in a manner whereby the second mirror provides a rear view behind a wide obstruction behind the first mirror, said fastening means comprising internally threaded bores formed through the guide members at spaced predetermined points and wing screws threadedly engaged in the bores for abutting the corresponding edges of the second mirror to secure the second mirror in position.

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3,977,775

## DAMPER FOR MOTION PICTURE FILM IN CINEMATOGRAPHIC APPARATUS

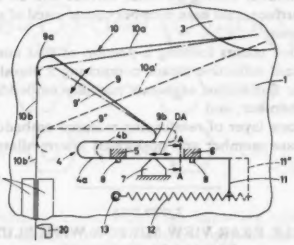
Wolfgang Riedel, Winnenden, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 13, 1975, Ser. No. 604,334

Claims priority, application Germany, Sept. 3, 1974, 2442148

Int. Cl.² G03B 1/56

U.S. Cl. 352—159 14 Claims



1. In a cinematographic apparatus, particularly in a motion picture projector, a combination comprising a support; a source of motion picture film mounted in said support for rotation about a predetermined axis; means for intermittently withdrawing film from said source whereby said source rotates and the tension of film intermediate said source and said withdrawing means fluctuates within a relatively narrow range as a result of intermittent withdrawal of film as well as randomly within a relatively wide range, such as in response to stray movements of said source with respect to said axis; an at least partly elastic damper having a first section which engages and loops the film intermediate said source and said withdrawing means and a second section, said first section being movable relative to said second section to compensate for fluctuations of film tension within said relatively narrow range; guide means provided on said support for said second section, said second section being movable in said guide means in first and second directions to respectively increase and reduce the size of the loop which is formed by said first section; and means for biasing said second section in said first direction, said first section being further movable relative to said second section to compensate for fluctuations of film tension within said relatively wide range with attendant movement of said second section in said second direction against the opposition of said biasing means.

3,977,776

## MOTION PICTURE CAMERA WITH IMPROVED FRAME COUNT INDICATOR

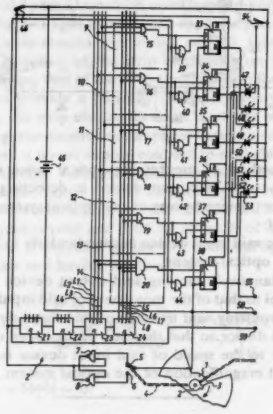
Eduard Wagensonner, Aschheim; Alfred Winkler, Munich, and Friedrich Winkler, Unterhaching, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Aug. 22, 1975, Ser. No. 607,056

Claims priority, application Germany, Aug. 30, 1974, 2441542

Int. Cl.² G03B 1/60

U.S. Cl. 352—171 8 Claims



1. In a motion picture camera having film including a plurality of frames and film-transport means for transporting said film, a frame counting and indicator arrangement, comprising, in combination, pulse generator means coupled to said film-transport means for generating at least one pulse for each frame transported by said film-transport means; counting means connected to said pulse generator means for counting the number of so-furnished pulses and furnishing counting signals signifying said number; a plurality of coupling means connected to said counting means, each for furnishing a coupling output signal in response to a corresponding one of said counting signals and for storing said coupling output signal thereby furnishing a stored coupling output signal; and a plurality of indicator means connected to said coupling means, each for furnishing a visual indication of a corresponding one of said stored coupling output signals, thereby furnishing an indication of the number of frames transported by said film-transport means.

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3,977,777

## IMAGE TRANSMISSION DEVICE FOR SLIT SCANNING TYPE PHOTOCOPYING MACHINE

Atsuyuki Tanaka, and Susumu Tanaka, both of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 30, 1974, Ser. No. 519,212

Claims priority, application Japan, Nov. 7, 1973, 48-128721

Int. Cl.² G03B 27/00, 27/76

U.S. Cl. 355—1 3 Claims

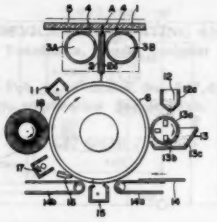
1. An image transmission device for slit scanning type photocopying machine comprising:

means for illuminating a document to be copied including at least one fluorescent lamp having a slit for emission of light therethrough to illuminate the document,

an electrical circuit connected with said fluorescent lamp for supplying alternating potential thereto for causing said lamp to emit varying intensities of illuminating light

therefrom with the amount of said light varying in accordance with said alternating potential,

means for scanning the document including an array constituted by a plurality of light transmitting light conducting fibers arranged in an elongated bundle extending in a direction transverse to the direction of scanning, the array and the document being relatively movable in the direction of scanning during the scanning, whereby the intensity of the light reaching an image receiving surface



through said light conducting fibers varies with a variation corresponding to the positions of the individual fibers in the array in a direction transverse to the scanning direction due to the properties of the light conducting fibers and varies with a variation corresponding to the varying intensities of light from said lamp in the direction of scanning due to the variation in the intensity of the light emitted by said lamp, for forming a mesh-pattern effect at the image receiving surface.

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**3,977,778**

## ELECTROPHOTOGRAPHIC APPARATUS

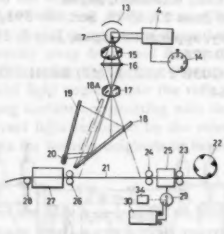
**Nachio Seko, Sagamihara, and Hiroshi Hirose, Machida, both of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan**

**Filed July 3, 1974, Ser. No. 485,751**

**Claims priority, application Japan, July 6, 1973, 48-75652**

**Int. Cl.² G03G *15/26***

**U.S. Cl. 355—3 R** **8 Claims**



1. Electrophotographic apparatus for producing, on a light-sensitive member, a positive toner image from either a positive or a negative original with toner of the same given polarity, including:

a. means for uniformly charging said light-sensitive member, including means for selecting the polarity to which the light-sensitive member is charged so that a positive toner image is obtained, with toner of said given polarity, for either a positive or negative original;

b. means, including an exposure lamp and controller therefor, for projecting an image of an original onto said light-sensitive member previously uniformly charged by said charging means, to form an electrostatic latent image on said member, said controller comprising means for adjusting the intensity of light emitted by said exposure lamp and having a first direction of adjustment and a second direction of adjustment;

c. means for developing the electrostatic latent image on said member with a toner of said given polarity; and

d. a change-over switch, operatively connected to said controller for selectably reversing the effect of a given direction of adjustment of said controller on the intensity of light emitted by said exposure lamp depending on whether said original is a positive or negative original.

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**3,977,779**

## ELECTROSTATOGRAPHIC TRANSFER WITH AIR

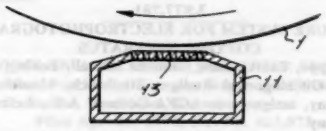
**Edric R. Brooke, Welwyn Garden City, England, assignor to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 30, 1974, Ser. No. 510,335**

**Claims priority, application United Kingdom, Dec. 21, 1973, 59530/73**

**Int. Cl.² G03G *15/00***

**U.S. Cl. 355—3 R** **2 Claims**



1. Electrostatographic reproduction apparatus including a moving imaging plate, means for producing an electrostatic latent image on said plate, development means for applying liquid developer material to said plate and developing an image of said developer material on said plate of said electrostatic latent image, transfer means for transferring said developer material from said imaging plate to an image support material, and means for feeding image support material to said transfer station, wherein said transfer means comprises non-contacting means for directing air under pressure against said image support material to press said image support material against said plate, and wherein said transfer means comprises an air chamber adapted to receive air under pressure and having a narrow perforated air ejecting wall facing, but spaced from said plate surface and extending thereacross, and wherein said wall has perforations angled in the direction of movement of said plate.

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**3,977,780**

## ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS

**James R. Cassano, Penfield; William A. Sullivan, Webster, and Thomas M. Krissel, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 25, 1974, Ser. No. 508,924**

**Int. Cl.² G03G *13/00***

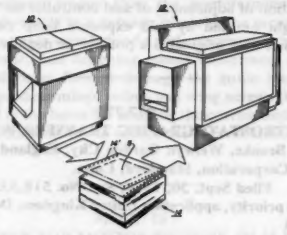
**U.S. Cl. 96—1 M** **7 Claims**

1. The method of copying a set of original documents to produce a predetermined number of copy sets, the steps which comprise:

a. producing on a master maker a permanent master copy of each document comprising said set in succession on an endless web;

b. bringing the web into operative relationship with copying apparatus to produce copies from the master copies on said web;

c. actuating said copying apparatus while advancing said web to make one copy of each master in sequence; and



d. recirculating said web the number of times equal to the predetermined number of sets desired.

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3,977,781

**EXPOSURE SYSTEM FOR ELECTROPHOTOGRAPHIC COPYING APPARATUS**

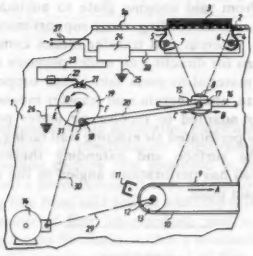
**Rudolf Eppe, Taufkirchen; Gunther Schnall, Eching; Gunter Abbe, Gilching, and Rudiger Ettelbruck, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed May 31, 1974, Ser. No. 475,150**

**Claims priority, application Germany, June 5, 1973, 2328463**

**Int. Cl.[2] G03B 27/32**

**U.S. Cl. 355—18** **13 Claims**



1. Apparatus for transferring images of stationary originals onto a light receiving surface, comprising, in combination, means for moving said surface in a predetermined direction along a first path; a stationary holder for said originals, said holder being spaced apart from said path and being arranged to support an original in a position in which one side of said original on said holder faces said path; flash means for illuminating said one side of said original for a predetermined short illuminating interval; a lens element disposed between said holder and said path; and means for moving said lens element in said predetermined direction along a second path parallel to said first path during said short illuminating interval, so thatsaid lens element images all of said one side of that said original onto said light receiving surface.

3,977,782

**WARMTH KEEPING METHOD FOR COPYING MACHINE**

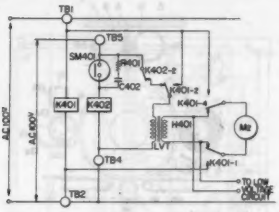
**Hisashi Sakamaki, Yokohama; Yoshimasa Kimura; Toshio Honma, both of Kawasaki; Tsuneki Inuzuka, Fuchu, and Katsushi Furuichi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 12, 1974, Ser. No. 531,876**

**Claims priority, application Japan, Dec. 21, 1973, 49-793**

**Int. Cl.[2] G03B 27/52**

**U.S. Cl. 355—30** **6 Claims**




1. A method of maintaining a copy processing component of a non-operating copying machine in a state such that copies may be readily obtained, wherein the machine includes a plurality of members, other than said component, which generate heat while having respective operating functions other than the generation of heat when energized at a particular rated voltage during operation of the machine, said method comprising the steps of:

a. maintaining said component at a predetermined temperature by applying a voltage to at least one of the members; and

b. supplying said applied voltage at a value lower than said rated voltage while the machine is in a non-operating condition so that said at least one member produces heat.

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3,977,783

**EXPOSURE DEVICE**

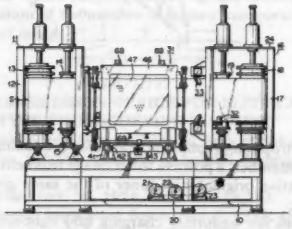
**Shuji Asaba, Fujisawa; Takeo Sato, Yokohama, and Kadode Okumura, Fukaya, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed June 27, 1975, Ser. No. 591,153**

**Claims priority, application Japan, July 5, 1974, 49-77667; July 5, 1974, 49-77669**

**Int. Cl.[2] G03B 27/52, 27/62; B65H 7/02, 17/26**

**U.S. Cl. 355—64** **11 Claims**



1. An exposure device comprising a transport mechanism for transporting a strip-like article in its longitudinal direction, a feed setting mechanism for operating said transport mechanism to cause the article to be intermittently moved at a predetermined interval, and an exposure mechanism disposed midway of a transport path to expose the predetermined surface portion of the article, in which said feed setting mechanism comprises detection means having a detection roller

engaged with the article and rotated as the article is transported, a detection bar adapted to be longitudinally moved from a first position to a second position according to the rotation of the detection roller, a switch operative, when said detection bar is moved to the second position, to stop the movement of the article, means for determining said second position of said detection bar, and means for returning said detection bar back into said first position, in which the intermittent feed distance of the article is determined by the movement of the detection bar.

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**3,977,784**

## CONDENSER DEVICE FOR LIGHTING AN ORIGINAL

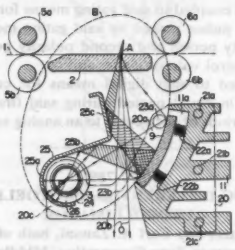
**Kazuyuki Hara, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan**

**Filed Feb. 6, 1975, Ser. No. 547,492**

**Claims priority, application Japan, Feb. 7, 1974, 49-15894[U]**

**Int. Cl.² G03B 27/16**

**U.S. Cl. 355—67** **9 Claims**



1. A facsimile device for concentrating light along a slit zone on an original, comprising a light source, a reflecting mirror for concentrating light from said light source onto the slit zone on an original, a light shield member generally surrounding said light source while avoiding interfering with the path of light passing from the light source through the reflecting mirror onto the slit zone, the light shield member being formed with first reflecting surface extending obliquely upwardly and toward said mirror and a second reflecting surface extending upwardly away from said first surface toward said slit zone, the first reflecting surface directing light incident thereon from the light source onto the reflecting mirror, the second reflecting surface cooperating with the reflecting mirror so as to direct light reflected by the mirror onto the slit zone; and means for feeding originals to be copied to said slit zone.

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**3,977,785**

## METHOD AND APPARATUS FOR INHIBITING THE OPERATION OF A COPYING MACHINE

**Ellis D. Harris, Claremont, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 6, 1975, Ser. No. 538,650**

**Int. Cl.² G03B 15/00**

**U.S. Cl. 355—133** **22 Claims**

1. A copying system modified to selectively control the reproduction of information contained on an information bearing member comprising in combination,

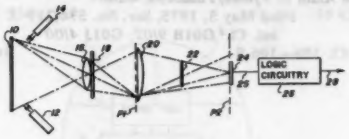
a copying device responsive to radiation within a predetermined region of the spectrum,

an information bearing member having information and a first code formed thereon,

means for generating radiation of a first wavelength and directing said radiation to said information bearing member,

a reference transparency positioned in the path of the radiation transmitted from said information bearing member, said reference transparency comprising a second code which is correlated with a predetermined code,

means responsive to the radiation transmitted through said reference transparency for generating a control signal when said first code is said predetermined code and not generating a signal when said first code is not said predetermined code, and




means coupled to said responsive means and operatively associated with said copying device for enabling said copying device to reproduce the information on said information bearing member when said control signal is generated by said responsive means and for inhibiting said copying device from reproducing said information when a control signal is not generated by said responsive means.

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**3,977,786**

## MODULAR OPTICAL SPECTROMETER SYSTEM

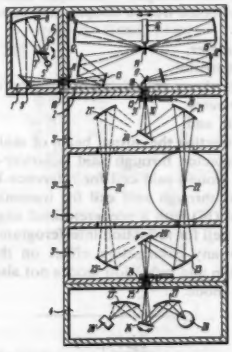
**Jürgen Gast, Forchheim, Germany, assignor to Bruker-Physik AG, Karlsruhe, Forchheim, Germany**

**Filed Apr. 25, 1974, Ser. No. 463,975**

**Claims priority, application Germany, Apr. 26, 1973, 2321097**

**Int. Cl.² G01J 3/42; G01N 21/16**

**U.S. Cl. 356—88** **10 Claims**



1. An optical spectrometer system comprising:

a first enclosed module having a source of a beam of optical radiation and an output port through which the optical beam can pass;

a second enclosed module having a detector of optical radiation and an input port through which the optical beam can pass;

a third enclosed module having an input port and an output port through which the optical beam can pass and means for holding a sample in the path of the optical beam;

means for rigidly joining the modules together with each of the output ports in optical alignment with an input port; and

means associated with each module having an output port for focussing the optical beam passing through the output

port to a point, each such focal point being located at substantially the same position with respect to its output port.

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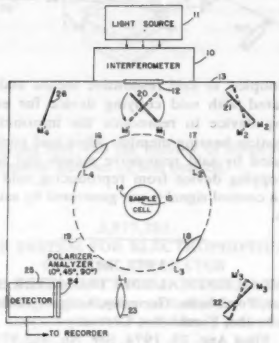
**3,977,787**

## HIGH-RESOLUTION FOURIER INTERFEROMETER-SPECTROPHOTOPOLARIMETER

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of and Alain L. Fymat, Pasadena, Calif.**

**Filed May 5, 1975, Ser. No. 574,219**
**Int. Cl.² G01B *9/02*; G01J *4/00***
**U.S. Cl. 356—106 S** **16 Claims**




1. A high-resolution Fourier interferometer-spectrophotopolarimeter for producing interferograms from which all four Stokes's parameters can be determined defining both intensity and the state of polarization of radiation transmitted through and reflected from a sample, said apparatus comprising:

an interferometer,

a radiation detector,

a polarizer-analyzer of variable orientation directly in front of said detector,

a sample cell, and

means for directing the output beam of said interferometer to said detector through said polarizer-analyzer selectively (i) around said cell for reference-beam interferograms, (ii) through said cell for transmission interferograms and (iii) with a predetermined angle of reflection from said cell for reflection interferograms with compensation for any polarization effect on the beam in the transmission and reflection modes not also present in the reference mode.

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**3,977,788**

## INTERFEROMETER STABILIZER

**Wayne E. Moore, College Park, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 4, 1975, Ser. No. 610,215**
**Int. Cl.² G01B *9/02***
**U.S. Cl. 356—106 S** **12 Claims**

1. A system for stabilizing interferometers comprising:

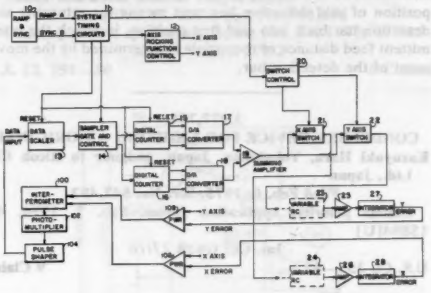
means for receiving a repetitive waveform and a sync pulse during each repetition;

timing means responsive to said waveform and said sync pulse for generating timing pulses at predetermined times during each repetition of said waveform;

means responsive to said timing means for generating a first bipolar control voltage cycle and a second bipolar control voltage cycle during alternate intervals;

means for receiving a train of frequency modulated pulses;

gating means coupled to said receiving means and responsive to said timing means for providing an output of said modulated pulses during predetermined periods of each polarity of each bipolar control voltage cycle;




digital means coupled to said gating means for counting the modulated pulses passed by said gating means during a first polarity period and second polarity period of each bipolar control voltage cycle; and

means coupled to said digital means for converting the difference in count passed during said first and second polarity periods of each cycle to an analog error voltage.

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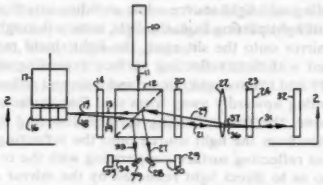
**3,977,789**

## SCANNING DIFFERENTIAL PHOTOELECTRIC AUTOCOLLIMATOR

**George C. Hunter, and Carl A. Zanoni, both of Middletown, Conn., assignors to Zygo Corporation, Middlefield, Conn.**

**Filed Apr. 7, 1975, Ser. No. 565,525**
**Int. Cl.² G01B *11/30*; G01N *21/48***
**U.S. Cl. 356—120** **6 Claims**



1. A device for measuring the light beam deviating properties of a test object which comprises 1) a source of light energy, which produces a narrow light beam 2) means for rotationally scanning said beam 3) means for collimating said rotationally scanned beam to produce a collimated, scanning beam 4) means for passing said collimated, scanning beam over a partially reflective, partially transmissive reference object with a reference surface having light beam deviating properties essentially similar to those of said test object, to produce a reflected reference beam, and a transmitted measurement beam which probes said test object, 5) means for collecting said transmitted measurement beam after it has probed said test object to provide an autoreflected, collected measurement beam 6) means for focusing said reflected reference beam and said autoreflected, collected measurement beam onto separate photoelectric position sensors and 7) means for comparing the outputs of said position sensors to obtain information with respect to the differences in the light beam deviating properties of the test object and the reference surface.

3,977,790

## APPARATUS FOR MEASURING THE DENSITY OF A CONTAINED LIQUID, BY UTILIZING THE ANGULAR DISPLACEMENT OF THE LIMITING ANGLE AT TOTAL REFLECTION

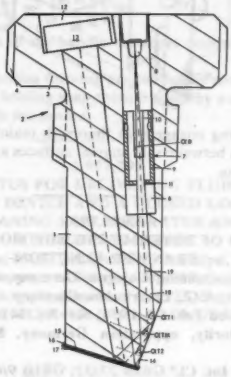
Walter Schweizer, and Martin-Ulrich ReiBland, both of Berlin, Germany, assignors to VDO Adolf Schindling, AG, Frankfurt am Main, Germany

Filed Sept. 13, 1973, Ser. No. 396,853

Claims priority, application Germany, Sept. 26, 1972, 2247095

Int. Cl.² G01N *21/46*

U.S. Cl. 356—136 1 Claim



1. An apparatus for measuring the density of a liquid by using the angular displacement of the limiting angle at total reflection comprising

A. an elongated light transducing rod,

B. a measuring surface limited to one end of said rod, wherein, in operation, the measuring surface is immersed into said liquid,

C. light source means for emitting a bundle of rays into the other end of the rod and directed to strike the measuring surface, the bundle of rays diverging on the measuring surface at a total divergent angle which is at least equal to the difference between the total reflection angles of the surface when respectively immersed into said liquid at its maximum and minimum densities within a range of densities to be measured by the apparatus, the bundle of rays being directed toward the measuring surface such that a longitudinal axis formed by the bundle of rays forms with a line perpendicular to the measuring surface an angle which is approximately equal to the total reflection angle of the measuring surface when it is immersed into a sample of said liquid having an average value of density within said range of densities to be measured,

D. a light detector on said other end of said rod responsive to the rays of said bundle of rays,

E. a light reflecting surface limited to said one end of said rod and placed to receive the rays which have been reflected by the measuring surface and to reflect the received rays to the light detector,

F. a battery closure plug on said rod at said other end of the rod remote from said one end of said rod, whereby said measuring surface reflects a portion of the beam which varies with the density of said liquid, said portion being again reflected by the reflecting surface to strike the light detector, the amount of light striking the light detector being a function of the density of the liquid,

G. a diaphragm provided between the light source and the measuring surface, and

H. means to displace the diaphragm along an axis parallel to the axis of the bundle of rays.

3,977,791

## METHOD OF RECOGNITION AND INTERPRETATION OF OBJECTS IN MICROSCOPIC OBSERVATIONS

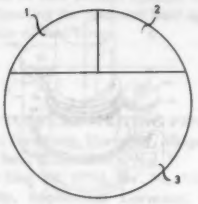
Klaus Weber, Konigsbronn; Lothar Trapp, Heidenheim (Brenz), and Gunther Kleinmaier, Aalen, all of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Germany

Filed Feb. 10, 1975, Ser. No. 548,670

Claims priority, application Germany, Feb. 15, 1974, 2434246

Int. Cl.² G01B *11/24*

U.S. Cl. 356—168 10 Claims




1. In the immunological-fluorescence method of using a microscopic to investigate a prepared object carrier, the improvement which comprises using micro-photographic images of two different preselected-strength reactions to produce in the field of view of said microscope two reference images at the same time and directly adjacent the microscopically produced object image.

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3,977,792

## SYSTEM FOR DETECTING REFLECTING OBJECTS

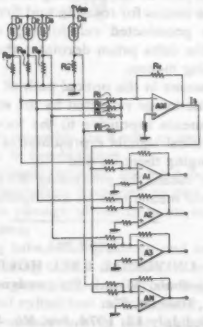
Hiroshi Jumonji; Masayoshi Sunada, both of Hitachi, and Shigeyoshi Kawano, Hitachiota, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 16, 1974, Ser. No. 533,084

Claims priority, application Japan, Dec. 17, 1973, 48-139627

Int. Cl.³ G06K *11/02*

U.S. Cl. 356—209 9 Claims



1. A system for detecting reflecting objects comprising a reflector supported on a supporting body,

means for directing light on said supporting body and said reflector,

a plurality of light detecting elements for receiving reflected light from said supporting body and said reflector, each of said plurality of light detecting elements producing an electrical output in response to light received from said supporting body and said reflector, said reflector being detected by a specific one of said plurality of said light detecting elements,

means for detecting said reflector by comparing the electrical output of said specific one of said plurality of light detecting elements with a reference signal, and

means for generating said reference signal from the average value of all of said electrical outputs from said plurality of light detecting elements.

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**3,977,793**

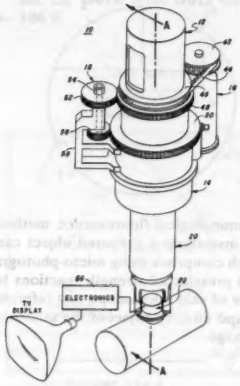
## RADIATION ENERGY RECEIVER

**Patrick A. Trotta, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 5, 1975, Ser. No. 555,746**

**Int. Cl.² G01J 1/42; G02B 23/02**

**U.S. Cl. 356—218** **10 Claims**




1. An infrared radiation energy detection system comprising:

a. a first rotatable housing;

b. a scanning means mounted in the first rotatable housing for scanning infrared energy radiating from objects in the field of view;

c. a second rotatable housing;

d. a delta prism mounted in the second rotatable housing in the optical path of the scanning means;

e. a rotatable means for rotating said first and second housings in a preselected relationship one to the other, whereby the delta prism derotates the rotating image of the scanning means;

f. focusing means in the optical path of the delta prism for focusing the image reflected by the scanning means;

g. detector means reponsive to the focused image to produce electrical signals representative of the radiant energy impinging thereon; and

h. electronic means for processing the electrical signals of the detector means into an intelligible format.

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**3,977,794**

## UNIVERSAL CELL HOLDER

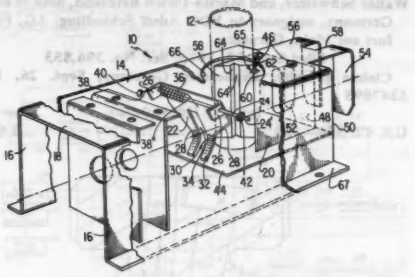
**Gerhard A. Liedholz, Miami, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.**

**Filed July 15, 1974, Ser. No. 488,753**

**Int. Cl.² G01N 21/16**

**U.S. Cl. 356—244** **31 Claims**

1. A universal cell holder comprising upright means defining a pair of upright oriented angular surfaces occupying intersecting vertical planes defining a V formation, deflectable pressure exerting means including at least one spring-biased arm having a free end normally disposed directed on a generally horizontal plane toward the interior apex of said V formation, mounting means vertically offset from said angular surfaces mounting said arm for pivotal movement about an axis spaced from said upright means, means biasing said pressure exerting means to assume said normal disposition within said V-formation and across the path of an object introduced between said angular surfaces and said pressure exerting means along a path taken vertically within said V-formation, said pressure exerting means being interceptible and deflectable by passage of said object, said pressure exerting means being moved in a direction outward of said V-formation displacing the said free end yet retaining a positive, minimum



contact, bearing engagement therewith maintaining the said object upright between said angular surfaces and said pressure exerting means.

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**3,977,795**

## METHOD OF DETERMINING THE MODULATION TRANSFER FUNCTION

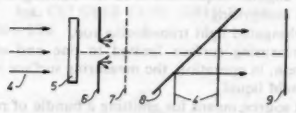
**Hans-Theo Buschmann, Cologne, Germany, assignor to AF-GA-Gevaert, A.G., Leverkusen, Germany**

**Filed Feb. 11, 1974, Ser. No. 441,353**

**Claims priority, application Germany, Feb. 15, 1973, 2307489**

**Int. Cl.² G02B 27/32; G01B 9/00**

**U.S. Cl. 356—256** **10 Claims**



1. In a method of determining the modulation transfer function of a recording system,

the steps of

illuminating a photographic plate with the coherent light of a laser beam through a diffuser and subsequent aperture, and then

processing that exposed photographic plate to produce a scatterer of known noise distribution;

the further steps of

projecting the scatterer with incoherent light onto the recording system to be tested,

then subjecting the recording system to photographic processing

and then, scanning the image on the processed recording system with a microphotometer whose output signal is subjected to a correlation analysis.

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**3,977,796**

## BODY SCRUBBER HAVING END GRIPS

**Roland A. Gillespie, and Minnie M. Gillespie, both of Eureka, Utah, assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Mar. 31, 1975, Ser. No. 563,654**

**Int. Cl.² A47K 7/03**

**U.S. Cl. 401—8** **1 Claim**

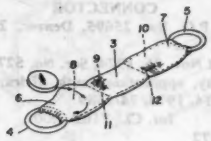
1. A body scrubbing device, comprising

a piece of terry cloth of predetermined dimensions;

two pieces of nylon net of the predetermined dimensions superimposed on the terry cloth, the terry cloth and nylon combination being folded over twice upon itself to form

a substantially strip-like configuration in a manner whereby the net is on the outside;

a pair of handle members each affixed to a corresponding end of the strip-like configuration of terry cloth and



nylon, each of the handle members comprising a plastic ring; and

transverse stitching forming pockets in the strip-like configuration for holding soap therein whereby a user may soap himself with the device.

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3,977,797

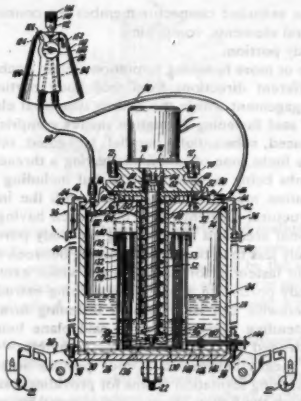
## APPARATUS FOR DELIVERING FLUID TO A UTILIZATION DEVICE AND A CLOSED LOOP SYSTEM FOR CLEANING SAID APPARATUS AND SAID UTILIZATION DEVICE

Peter J. Paterson, 15-17 Denton Place, Brooklyn, N.Y. 11215

Continuation-in-part of Ser. No. 489,803, July 22, 1974, abandoned. This application May 6, 1975, Ser. No. 575,011

Int. Cl.² A46B *15/00*; B44D *3/28*

U.S. Cl. 401—15 34 Claims



1. Apparatus comprising:

a. a container for holding a supply source of fluid, said container including an end wall and an axially elongated sidewall extending upwardly therefrom;

b. fluid conveyer means having an end portion positioned below level of the fluid in said container;

c. a motor drivingly coupled to said conveyor means;

d. first elongated conduit means having a first end in fluid communication with said conveyor means, said first conduit means defining a first passageway for removing fluid from said container;

e. second elongated conduit means having a first end in fluid communication with interior of said container, said second conduit means defining a second passageway for returning fluid to said container;

f. a first, multi-position valve means in fluid communication with a second end of both said first and second conduit means, said first valve means being adapted to transfer fluid from the source through a first position thereof and to return at least a portion of the fluid to the source at said first position thereof, said first valve means further having a second position so that the fluid flow from the source, through said first conduit means, through said first valve means in said second position thereof, and back to the source via said second conduit means;

g. a utilization device in fluid communication with said first valve means, said utilization device having a dispensing portion;

h. a cover sealingly mounted on said container; and

i. said first end of said second conduit means including a nozzle for directing the returned fluid against an inwardly facing surface of said cover.

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3,977,798

## TUBULAR WRITING PEN

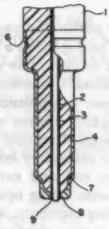
Lasse Kuparinen, Hamburg, Germany, assignor to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Filed Dec. 20, 1974, Ser. No. 535,051

Claims priority, application Germany, Dec. 22, 1973, 2364217

Int. Cl.² B43K *1/10*

U.S. Cl. 401—258 1 Claim



1. A writing point assembly for a tube or stylographic writing pen comprising, in combination:

A. a plastic cylindrical member, having a front end and a rear end, and traversed from end to end by a channel adapted for the passage of ink from an ink reservoir at said rear end, and;

B. a metal writing tube, having a front end and a rear end, wherein said writing tube is attached, to said cylindrical member, by encompassing, in a surrounding relation, said front end of said cylindrical member, and;

C. said rear end of said writing tube including a radially inwardly directed annular corrugation engaging a similar annular groove in said front end of said cylindrical member, and;

D. said front end of said writing tube including a substantially flat face surrounding said front end of said plastic cylindrical member, said flat face being formed to define an ink outlet orifice, said face being work-hardened to define a hard writing surface, wherein;

E. said ink passage channel in said cylindrical body extends within said writing tube from said rear end to, and directly communicating with, said ink outlet orifice at said flat front face of said writing tube and including a weighted cleaning wire extending axially within said ink passage channel means and into said ink outlet orifice.

3,977,799

## FILING DEVICE FOR PAPERS

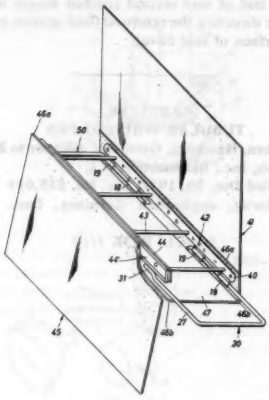
Karl-Heinz Schudy, Espelkamp, and Heinz Kleinert, Lubbecke, both of Germany, assignors to Robert Krause KG, Espelkamp, Germany

Filed Mar. 10, 1975, Ser. No. 557,203

Claims priority, application Germany, Jan. 11, 1975, 2500918

Int. Cl.² B42F 3/00; B42D 17/00

U.S. Cl. 402—4 5 Claims



1. A filing device for perforated papers comprising a spine, a first cover pivoted to said spine at a first pivotal connection, a second cover pivoted to said spine at a second pivotal connection, said spine having terminating ends, a carrier rail secured to said first cover at a position spaced from said first pivotal connection, locking means secured to said second cover at a position spaced from said second pivotal connection, filing elements for releasably holding perforated papers secured to said carrier rail and extending to said locking means, said locking means being operable to selectively engage or release said filing elements, whereby in said engaged position said locking means engages and holds said filing elements to thereby secure said locking means, said filing elements, said carrier rail, and said covers in a fixed position relative to one another and to prevent removal of perforated papers from said filing elements in said filing device and in aid release position said filing elements are released from said locking means to provide for removal or placement of papers on said filing elements, a pair of suspension members each having a generally U-shaped configuration having a pair of leg elements, one of said leg elements being disposed between said first pivotal connection and said carrier rail, the other of said leg elements being disposed between said second pivotal connection and said locking means, and mounting brackets each having a flat portion secured to said carrier rail between the latter and said first cover and having a support portion for slidably and pivotably supporting one of said leg elements of said U-shaped suspension members, said suspension members being longitudinally slidable on said mounting brackets between extended positions in which said suspension members extend beyond said terminating ends of said spine to permit said filing device to be suspended with its spine uppermost from a suspension rail system or the like and a retractable position in which said suspension members are disposed contiguous or inwardly of said terminating ends of said spine, said suspension members being pivotal on said mounting brackets whereby upon release of said locking means, said filing elements are released from said locking means such that said filing elements, said carrier rail, said mounting brackets and said first cover may be pivoted as a unit about said first pivot axis as said one leg of said suspension member pivots relative to said support portion of said mounting bracket to thereby facilitate access to said filing elements and said papers.

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3,977,800

## CONNECTOR

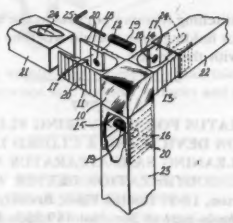
Joe R. Cassel, P.O. Box 25695, Denver, 2027, Transvaal, South Africa

Filed Nov. 26, 1974, Ser. No. 527,281

Claims priority, application South Africa, Feb. 19, 1974, 74/1074; Mar. 14, 1974, 74/1689

Int. Cl.² F16B 7/00

U.S. Cl. 403—172 5 Claims



1. An extruded connector member for connecting hollow structural elements, comprising:

a body portion;

three or more fastening formation means, each extending in different directions from said body portion for stable engagement within the hollow structural elements, each of said fastening formation means comprising a pair of spaced, substantially parallel, elongated, relatively flexible limbs, one of said limbs having a threaded hole, said limbs being substantially flat but including gripping formation means for engagement with the interior of the structural elements, said limbs each having a cross-sectional area in a plane facing the body portion, substantially less than the area of spacing between them, each of said fastening formation means which extend from said body portion in a single plane being extruded integrally therewith and each of said fastening formation means extending perpendicular to said plane being separately extruded and separately secured thereto;

step means between said body portion and each of said fastening formation means for providing a surface against which the hollow structural elements abut when properly connected; and

screw means for splaying each of said pairs of limbs to effect a force fit of each of said fastening formation means within the structural elements by engaging said threaded hole of one limb and abutting the other limb of each of said fastening formation means.

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3,977,801

## CONNECTOR FOR STRUCTURAL MEMBERS

Thomas Philip Murphy, 10 Heather Place, Brampton, Ontario, Canada

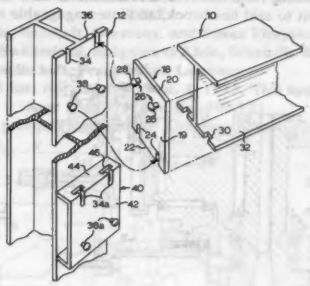
Filed Nov. 22, 1974, Ser. No. 526,104

Int. Cl.² F16B 7/04; F16L 41/00

U.S. Cl. 403—189 15 Claims

1. A device for use in interconnecting two structural members, comprising plate means having a planar face and a circumferential edge, at least two parallel slots in the plate means

extending from the edge of the plate means, and at least two studs projecting outwardly from the face of the plate means,



the studs being arranged to be engagable in the slots of an inverted device of like construction.

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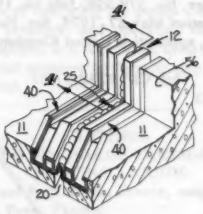
3,977,802

## EXPANSION JOINT AND SEAL

Richard N. Galbreath, Richmond, Va., assignor to Structural Accessories, Inc., Lenoir, N.C.

Filed Aug. 4, 1975, Ser. No. 601,837
Int. Cl.² E01C *11/02*
U.S. Cl. 404—69 17 Claims



1. An expansion joint adapted to overlie and sealingly close a longitudinally extending expansion gap between roadway bridge sections or the like, and characterized by the ability to accommodate relative movement of the sections in each of the vertical, longitudinal, and lateral directions, said joint comprising

an elongate membrane adapted to be positioned within opposing channels of generally rectangular cross-sectional configuration which extend longitudinally along the adjacent top side edges of the roadway sections, said membrane comprising

a. a pair of relatively flat, substantially co-planar, longitudinally extending side edges, with each side edge being adapted to be received in and overlie the lower surface of one of the channels, and

b. an integral arch positioned intermediate the pair of side edges so as to be adapted to be disposed within and extend longitudinally along the expansion gap, said arch extending outwardly from the plane of said side edges and having a corrugated configuration with the corrugations thereof extending in a lateral direction to thereby impart substantial flexibility to the membrane such that the membrane is able to accommodate relative movement of the roadway sections in each of the vertical, longitudinal, and lateral directions,

a pair of elongate side rails, each of said rails having a cross-sectional configuration which is adapted to be received within and extend longitudinally along one of the roadway channels and overlying the associated membrane side edge, and with the upper surface of the side rails being substantially level with the upper surface of the roadway, and

means for anchoring the membrane and side rails within the channels.

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3,977,803

## PROCESS FOR DEVELOPING SURFACES

Robert F. Bischoff, Jr., 30 Fairmount Ave., Morristown, N.J. 07960

Filed Dec. 11, 1974, Ser. No. 531,467
Int. Cl.² E01C *3/06*
U.S. Cl. 404—72 3 Claims

1. A process for developing a surface covering of settable material to a level having a uniform elevation, said settable material being applied to an existing sound surface, said process comprising:

a. arrangement of pre-set points in pre-determined places on said existing sound surface;

b. determination of the height of said pre-set points by means of an instrument;

c. formation of said pre-set points of said settable material which sets to said pre-determined heights;

d. construction of screed means along the said points, said screed means to be constructed to the same height as the surface and points;

e. the pouring of a layer of material which sets between the pre-set screed means and points and leveling the newly poured material to the height of the pre-set screeds, so that the screeds become part of the newly poured material which forms a surfacing module.

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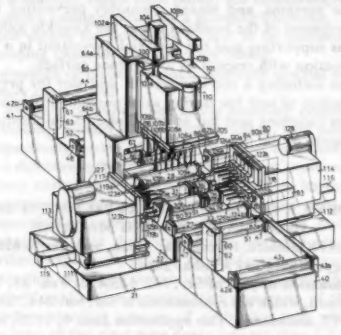
3,977,804

## MULTIPLE SPINDLE DRILLING MACHINE FOR WIDE FLANGE BEAMS

Toshikatsu Kitagawa, Seki, Japan, assignor to Miyakawa Industry Company, Ltd., Japan

Filed Mar. 3, 1975, Ser. No. 554,921
Claims priority, application Japan, Mar. 3, 1974, 49-24928
Int. Cl.² B23B *49/00*, *39/22*
U.S. Cl. 408—16 10 Claims



1. A multiple spindle drilling machine comprising a machine table having a supporting device on the upper side thereof for supporting a wide flange beam, feeding means positioned in front of said machine table for feeding a wide flange beam on said supporting device; first drilling means positioned so as to be moveable toward the web of a wide flange beam on said supporting device from the upper position of said machine table and having multi-drills for drilling a plurality of bores through the web; second and third drilling means positioned so as to be simultaneously moveable with said first drilling means toward a pair of flanges of a wide flange beam from both side positions of said machine table and having multi-

drills for drilling a plurality of bores through the flange; and stopping means for stopping a wide flange beam fed on said supporting device by said feeding means at the predetermined drilling position, said stopping means including a stop member adapted to contact with the end portin of the wide flange beam for stopping the wide flange beam without moving over the predetermined drilling position and a switch member adapted to engage with the end portion of the wide flange beam for changing said feeding means under the static condition.

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**3,977,805**

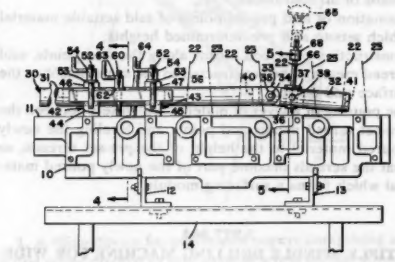
## TOOL BAR HOLDER

**Irvin E. Wanous, 3409 Quail Ave. North, Minneapolis, Minn. 55422**

**Continuation of Ser. No. 492,338, July 26, 1974, abandoned. This application Jan. 7, 1976, Ser. No. 647,194**

**Int. Cl.² B23B *41/12***

**U.S. Cl. 408—115 B** **4 Claims**



1. In combination:

a rigid bar having at least one diametral slot extending axially along an appreciable portion of its length, and having a cross-bore aligned with said slot, said bar comprising first and second portions connected by a knuckle joint having an axis normal to the plane of said slot, said slot and said cross-bore being located in different ones of said portions, and means releasably preventing relative movement of the portions about the knuckle joint;

means supporting said bar for axial movement in a desired direction with respect to a reference surface;

means including a rod received in said slot for preventing rotation of said bar during axial movement thereof; and

means clamping said bar at any desired axial position with respect to the support means.

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**3,977,806**

## DEVICE FOR MOUNTING ATTACHMENT ON HORIZONTAL BORING MACHINE

**Toshiyuki Kinoshita, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Japan**

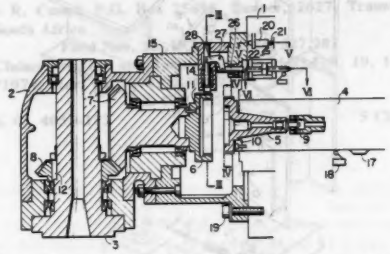
**Continuation-in-part of Ser. No. 445,436, Feb. 25, 1974, abandoned, which is a continuation of Ser. No. 244,765, April 17, 1972, abandoned. This application June 4, 1975, Ser. No. 583,553**

**Claims priority, application Japan, Apr. 20, 1971, 46-24959**

**Int. Cl.² B23B *47/00***

**U.S. Cl. 408—141** **4 Claims**

1. In a horizontal boring machine comprising a headstock formed with a tool head mounting face and rotatably supporting an axially reciprocal headstock spindle, means for always stopping said headstock spindle in the same predetermined angular position, a first toothed clutch member on the free end of said headstock spindle and rotatable therewith, a tool head attachment having tool driving means and being releasably coupled to the mounting face of said headstock, a second toothed clutch member rotatably supported in said attachment and positioned to be axially alignable with said first toothed clutch member, releasable means being operable to retain said second clutch member in a predetermined angular position in which its teeth are in correct meshing alignment with the teeth of said first clutch member, said releasable means being responsive to securement of said tool head attachment to said headstock, and interengageable means associated with said tool head attachment and said headstock and being operable to retract said releasable means to release said second clutch member, whereby the teeth of said clutch members will have a smooth interengagement upon axial advance of the headstock spindle.



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**3,977,807**

## TWIST DRILLS

**Keith Siddall, Sheffield, England, assignor to Osborn-Mushet Tools Limited, Sheffield, England**

**Continuation of Ser. No. 379,350, July 16, 1973, abandoned. This application May 27, 1975, Ser. No. 580,769**

**Claims priority, application United Kingdom, July 21, 1972, 34325/72**

**Int. Cl.² B23B *51/02***

**U.S. Cl. 408—223** **6 Claims**

1. A twist drill having a longitudinal axis and a cutting tip; a plurality of flutes extending helically longitudinally of the drill and having leading and trailing front edges at said tip; a chisel edge at said tip of the drill; lands located between the flutes, said lands comprising primary lands extending helically of the drill and at least one secondary land associated with each primary land and extending helically of the drill in circumferentially spaced relation to the rear of its associated primary land, a cutting tip comprising major flanks, each formed by said leading and trailing front edges of adjacent flutes, adjacent land and adjacent chisel edge, each of the primary lands being relieved for a limited distance from its adjacent major flank to form a minor flank; the leading front edge of each flute and the intersection of the flute with the minor flank defining a drill cutting edge which extends into the periphery of each primary land at a smaller radius from said longitudinal axis than it extends into the periphery of the associated secondary land so that each secondary land forms a sizing flank for taking a skimming cut following the cut taken by its associated primary land.

3,977,808

## METHOD AND MEANS FOR ABRUPTLY TERMINATING THE FLOW OF FLUID IN CLOSED CIRCULATING SYSTEMS OF NUCLEAR REACTOR PLANTS OR THE LIKE

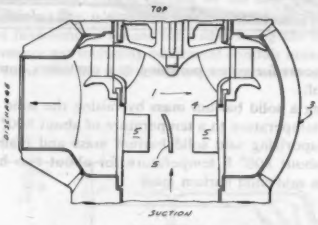
Otto Schiele, Neustadt, Germany, and Dusan Florjancic, Winterthur, Switzerland, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Germany

Division of Ser. No. 394,210, Sept. 4, 1973. This application Aug. 23, 1974, Ser. No. 500,121

Claims priority, application Germany, Sept. 2, 1972, 2243365

Int. Cl.² A04D 1/00

U.S. Cl. 415—1 9 Claims




1. A method of automatically compensating for an abrupt drop of system pressure in a closed primary cooling circuit of a nuclear reactor plant wherein a fluid is normally circulated by at least one centrifugal pump at a constant pressure, comprising the steps of operating the pump without cavitation at normal system pressure, and operating the pump with full cavitation in response to a substantial drop of system pressure below said normal pressure to thereby stop circulation of the fluid by the pump.

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3,977,809

## CONTROLLED DISCHARGE PRESSURE PUMP FOR PUMPING LIQUIDS

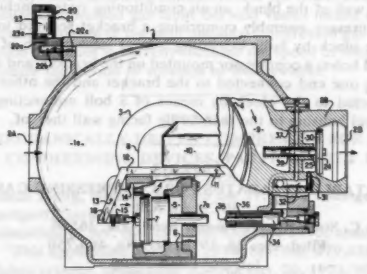
Albert Alfred Paul Petit, Paris, France, assignor to A. Petit & Co. S.A.R.L., Paris, France

Filed Feb. 10, 1975, Ser. No. 548,359

Claims priority, application France, Feb. 14, 1974, 74.05031

Int. Cl.² F01D 17/02, 17/08

U.S. Cl. 415—29 8 Claims



1. A variable flow rate pump for pumping liquids comprising a bowl-like case having a liquid inlet port connected to an inside space of said bowl-like case said inside space defining a liquid retaining chamber; a liquid outlet port connected to a liquid circuit which includes rotative pumping means in said bowl-like case; a valve means connected to a float member adapted to follow the level of the liquid within said liquid retaining chamber of said bowl-like case; control means for controlling the valve means and therefore the discharge output pressure and delivery flow rate, respectively, including a hydraulic control circuit comprising a linear displacement actuator having a cylinder and a resiliently biased piston to act upon the valve means; an enclosed container space in liquid flow communication with the cylinder; a first duct between the enclosed container space and the liquid outlet port and a second duct between the enclosed container space and the inside space, the second duct having head loss varying means.

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3,977,810

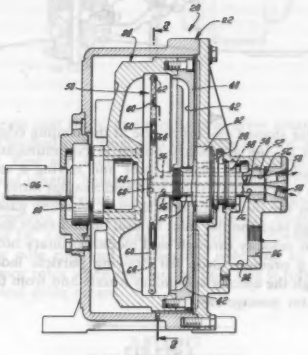
## MULTIPLE OUTLET, CONSTANT FLOW, PITOT PUMP

John W. Erickson, Huntington Beach, and Walter W. Crichlow, Santa Ana, both of Calif., assignors to Kobe, Inc., Huntington Park, Calif.

Filed Sept. 23, 1974, Ser. No. 508,427

Int. Cl.² F04D 1/14

U.S. Cl. 415—89 12 Claims



1. In a multiple outlet pitot pump, the combination of:

a. a rotary casing containing a pumping chamber;

b. feed means for delivering a fluid to be pumped to the pumping chamber in said rotary casing;

c. a plurality of discharge ducts generally coaxial with said rotary casing; and

d. a plurality of pitot tubes in the pumping chamber and extending radially of said rotary casing, said pitot tubes respectively having adjacent their outer ends inlets facing in a direction opposite to the direction of rotation of said rotary casing, said pitot tubes respectively having radial passages and having adjacent their inner ends outlets respectively connecting the inner ends of said radial passages to said discharge ducts, and said pitot tubes further respectively having circumferentially rearwardly extending passages connecting said inlets to the outer ends of said radial passages, the area ratio of the rearwardly extending passage of each pitot tube relative to the inlet of the pitot tube being greater than 1.1 to 1.

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3,977,811

## AIR PUMP FOR USE IN DUSTY ENVIRONMENT

Charles Kuintzle, Jr., Monroe, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Oct. 23, 1975, Ser. No. 624,867

Int. Cl.² F04D 29/70

U.S. Cl. 415—121 G 7 Claims

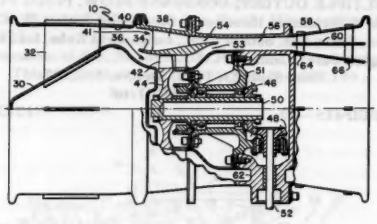
1. Apparatus for use in pumping particle laden gases comprising:

a housing having a generally cylindrical passageway therethrough, said passageway having an inlet and an outlet;

deflector means supported at said inlet for imparting an inertial force to incoming particles for directing them toward the housing wall;

a driven bladed rotor mounted in an intermediate region of said passageway;

an axially extending shroud of circular cross section surrounding said bladed rotor and dividing said passageway into inner and outer axially extending passageways, the leading edge of said shroud being adjacent the lee side of said deflector means and forming therebetween an annular inlet in communication with the inlet side of said bladed rotor; and



an annular shaped ejector nozzle at the trailing edge of said shroud having a primary nozzle in communication with the outlet of said bladed rotor and having a secondary nozzle in communication with said annular outer passageway on the outside of said shroud, whereby gases drawn through said annular inlet by said bladed rotor and forced at high velocity through said ejector primary nozzle provides a pressure drop for drawing particle laden gases through the ejector secondary nozzle and from the annular outer passageway.

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**3,977,812**

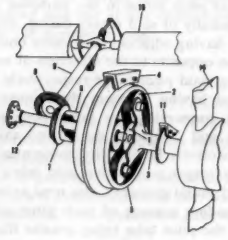
**COMPOUND HELICOPTER DRIVE MEANS**

**Wayne A. Hudgins, Hampton, Va., assignor to The United States of America as represented by the Secretary of the Army, Alexandria, Va.**

**Filed Nov. 17, 1975, Ser. No. 632,340**

**Int. Cl.² B64C *27/22***

**U.S. Cl. 416—123** **6 Claims**



1. In a compound helicopter having an anit-torque tail rotor and an adjacent rear propulsion propeller adapted to be coupled to a helicopter engine, rotor and propeller drive means therefor comprising a single planetary gear set with its three relatively rotatable gear members, its first gear member being adapted to be driven by the helicopter engine, its second gear member being adapted to drive the anti-torque tail rotor, and the third gear member being adapted to drive the propulsion propeller, in combination with brake means for said second and third gear members.

**3,977,813**

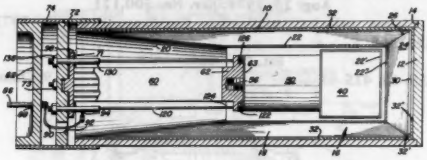
**NOVEL GETTER AND PROCESS**

**Thomas Stratton Bustard, Ellicott City, and David Earl Goslee, White Marsh, both of Md., assignors to Nuclear Battery Corporation, Columbia, Md.**

**Continuation-in-part of Ser. No. 189,840, Oct. 18, 1971, abandoned. This application Jan. 18, 1974, Ser. No. 434,693**

**Int. Cl.² F04B *37/00***

**U.S. Cl. 417—49** **13 Claims**



1. A process for getter pumping in a container comprising the steps of:

activating a solid barium mass by raising the solid barium mass temperature to a temperature of about 800° F without vaporizing said solid barium mass and maintaining said about 800° F temperature for about two hours to outgas said solid barium mass.

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**3,977,814**

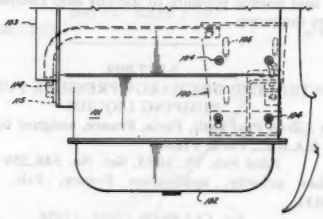
**AUTOMOBILE AIR CONDITIONING SYSTEM**

**Don P. Dixon, and George B. Kobel, both of P.O. Box 18327, Serna Station, San Antonio, Tex. 78286**

**Filed July 15, 1974, Ser. No. 488,735**

**Int. Cl.² B60H *3/04***

**U.S. Cl. 417—364** **2 Claims**



1. In an automobile having tapped holes in the right side of its engine block and a flywheel housing bolted to a rearwardly facing wall of the block; an air conditioning system including a compressor assembly comprising a bracket secured to the engine block by bolts extending into at least certain of said tapped holes, a compressor mounted on the bracket, and a rod having one end connected to the bracket and the other end connected to the block by means of a bolt connecting the flywheel housing to the rearwardly facing wall thereof.

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**3,977,815**

**PORTABLE APPARATUS FOR COMPRESSING GASES SUCH AS AIR**

**James C. Stull, Rte. 1, Vinegar Bend, Ala. 36584**

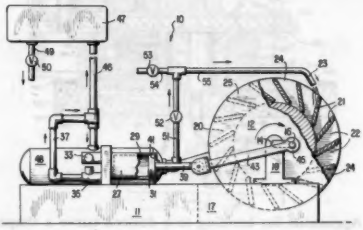
**Filed Apr. 24, 1974, Ser. No. 463,750**

**Int. Cl.² F04B *17/00***

**U.S. Cl. 417—323** **4 Claims**

1. Apparatus for compressing gases comprising support means, substantially friction-free spaced mounting members supported by the said support means, a rotatable massive flywheel fixedly mounted on a shaft, the said shaft having spaced end portions which extend outward from the flywheel, the said spaced end portions of the shaft being rotatably mounted in the said spaced mounting members whereby the

said flywheel is capable of being rotated rapidly with substantially no friction, means actuated by an outside source of power for initially rapidly rotating the flywheel, the said means for rapidly rotating the flywheel being rendered ineffective after the flywheel is rotating at a sufficiently rapid rate whereby the momentum of the flywheel is the sole ultimate source of power available for operating the apparatus, a compressor for gases carried by the support means, the compressor including compressor means adapted to be powered solely by the momentum of the rapidly rotating flywheel, means for supplying low pressure gas to the compressor, means powered solely by the momentum of the rapidly rotating flywheel for driving the compressor and thereby compressing the low pressure gas to a relatively high pressure, first conduit means for withdrawing the compressed high pressure gas from the compressor, vessel means carried by the said support means for containing the withdrawn compressed high pressure gas, the said first conduit means for withdrawing the compressed high pressure gas including additional conduit means for passing the same into the said vessel means, second conduit means



for withdrawing compressed high pressure gas from the said vessel means and for passing the same to a compressed gas operated device whereby the said device is operated thereby, the said first conduit means for withdrawing the compressed high pressure gas from the compressor and the said second conduit means for withdrawing the compressed gas from the vessel means being in communication with the interior of the said vessel means at points which are in spaced relationship and being capable of supplying high pressure compressed gas to the vessel means at one of said spaced points and withdrawing the same from the vessel means at the other of said spaced points, the said rapidly rotating flywheel having air vanes in the circumference thereof whereby a stream of high pressure gas may be directed against the air vanes to increase the speed of rotation of the flywheel or maximize the period of rotation of the flywheel, and third conduit means for withdrawing high pressure compressed gas from the said vessel means and for directing a stream of the high pressure compressed gas against the said air vanes to thereby increase the speed of rotation or maximize the period of rotation of the flywheel.

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**3,977,816**

## MECHANICALLY DRIVEN COMPRESSOR FOR AIR CONDITIONING DEVICES, PARTICULARLY IN VEHICLES

**Nikolaus Laing, Hofener Weg 35 bis 37, 7141 Aldingen near Stuttgart, Germany**

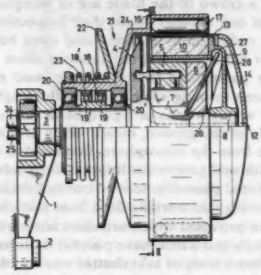
**Continuation of Ser. No. 297,872, Oct. 16, 1972, abandoned. This application June 14, 1974, Ser. No. 479,435**

**Claims priority, application Austria, Oct. 20, 1971, 9055/71**

**Int. Cl.[2] F04B** *17/00, 35/04;* **F01C** *21/04;* **F04C** *29/02*

**U.S. Cl. 417—355** **1 Claim**

1. A magnetically driven compressor for an air-conditioning device comprising an axially extending compressor rotor for pumping a refrigerant, a fixed axially extending compressor housing circumferentially surrounding said compressor rotor, an axially extending first pole ring exterior of said compressor housing connected at one axial end to and circumferentially surrounding said compressor rotor, an axially extending second pole ring circumferentially surrounding said first pole ring and spaced therefrom by a gap, DC windings on said second pole ring adapted to be connected to a source of DC current, an axially extending magnetically pervious wall in said gap circumferentially surrounding said first pole ring, wall means including said magnetically pervious wall forming a chamber hermetically sealing therein said first pole ring, lubricating means within said chamber for circulating a lubricating fluid



to lubricate said rotor, and mechanical drive means for rotating said second pole ring; said compressor rotor, compressor housing, first and second pole rings being substantially the same axial length, being positioned co-axially with respect to each other, and being spaced radially with respect to each other whereby when said DC windings are connected to a source of DC current, a magnetic couple is provided between said first pole ring and said second pole ring to rotate said compressor rotor when said second pole ring is rotated by said mechanical drive means.

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**3,977,817**

## ROTARY MACHINE

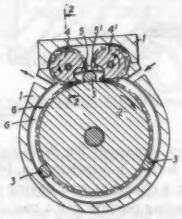
**Jean Andre Monteil, rue de Provence, 71, 75009 Paris, France**

**Continuation-in-part of Ser. No. 168,918, Aug. 4, 1971, abandoned. This application Oct. 23, 1973, Ser. No. 408,397**

**Claims priority, application United Kingdom, Nov. 2, 1971, 36193/71**

**Int. Cl.[2] F01C** *1/08, 19/04*

**U.S. Cl. 418—196** **11 Claims**



1. A rotary device comprising a cylindrical rotor arranged for rotation about its axis and having over half the length thereof a peripheral annular groove and a plurality of sets of at least two blades within said groove extending from one edge of said groove to the other, having the same depth as said groove, and dividing said groove into a plurality of fluid-tight segmental channels bounded at the periphery of the rotor, a hollow fixed generally cylindrical stator closely surrounding said rotor and said groove thereby closing said channels and being formed with at least one set of at least two closely spaced cavities distributed in a zone overlying and communicating with said groove, at least one set of at least two cylindri-

cal shutter wheels, arranged in series of at least two, one immediately after the other wholly mounted in respective cavities of said stator to be rotatable about axes parallel to the axis of said rotor in engagement with the groove, and projecting into said groove so as effectively to subdivide each channel into two portions varying in length during relative rotation between said rotor and said stator, adjacent portions being at different pressures from each other, said shutter wheels each being formed with a recess in its periphery arranged in number to receive said blades and in shape so that a bottom of the recess and a crown of the blade are of complementary shape to turn past one another about their respective axes without rubbing or rolling, and including said rotor being coupled to said shutter wheels so that the recesses allow the passage of each blade passed the shutter wheels, said stator and said shutter wheels forming a substantially fluid-tight seal with the blades and with portions of a peripheral surface of said rotor at each side of the groove, means being provided for sealing said groove from the atmosphere, first conduit means communicating with said groove for intermittently admitting a working fluid to said channels, second conduit means for intermittently removing said working fluid from said channels and end portions are provided which are associated with each of said shutter wheels and which have parallel faces and are larger in diameter than a body of said shutter weels to define shoulders thereon, a bottom of said groove and the internal surface of each portion of the stator covering each shutter wheel being formed with slots along each side to permit chamfered ends of the shutter wheels to pass with a small clearance, whereby the system is arranged to undergo unrestrained rotation.

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**3,977,818**

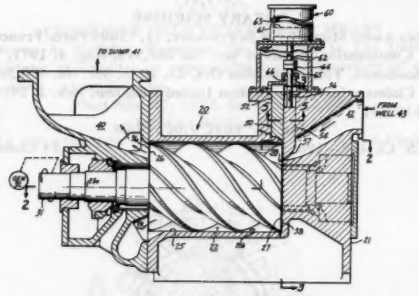
## THROTTLING MEANS FOR GEOTHERMAL STREAMS

**Roger S. Sprankle, Mission Viejo, Calif., assignor to Hydrothermal Power Co., Ltd., Pasadena, Calif.**

**Filed Jan. 17, 1975, Ser. No. 541,854**

**Int. Cl.² F01C** *1/16, 21/12;* **F03G** *7/04*

**U.S. Cl. 418—201** **8 Claims**



**1.** A helical screw expander for deriving energy from geothermally heated water, comprising: a block enclosing an expander chamber; a chamber wall having an axis and including an axially-extending portion and a pair of planar end faces, said portion and said end faces defining said expander chamber; a pair of mating helical rotors extending axially and side-by-side in said expander chamber, each helical rotor including a helical structure which moves in adjacency to the axially-extending portion, and further including a pair of end faces, each of which moves in adjacency to a respective end face of the chamber wall; an exhaust port opening into one end face of the expander chamber; an exhaust passage extending through the block and opening into the exhaust port; a throttle port in the other end face of the expander chamber; a supply passage extending through the block and opening into the throttle port; an adjustably movable throttle block forming together with the wall of the supply passage an adjustable nozzle which terminates at the respective end face of the expander chamber and is so proportioned and and arranged as to direct a stream of liquid from the supply passage to impinge onto a helical structure whereby to impart kinetic energy to said helical structure and assist in rotating it, the cross-section of the throttle, at the throttle port, being the least cross-section of the supply passage; and means to move the throttle block and thereby adjust the size of the nozzle.

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**3,977,819**

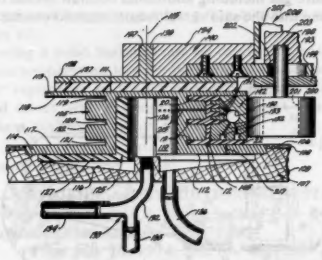
## APPARATUS FOR BENDING THERMOPLASTIC SHAPES

**John I. Gates, 114 Via Mentone, Newport Beach, Calif. 92663**

**Division of Ser. No. 329,661, Feb. 5, 1973, abandoned, which is a division of Ser. No. 145,866, May 21, 1971, abandoned. This application May 21, 1974, Ser. No. 471,276**

**Int. Cl.² B29C** *17/00*

**U.S. Cl. 425—394** **33 Claims**



**1.** Apparatus for bending to a desired curve a shape fabricated of substantially rigid thermoplastic material, the apparatus comprising

a. a rigid die member defining a first die surface configured to mate intimately with a portion of the cross-sectional configuration of the shape prior to and during bending of the shape, and to define the desired curve to which the shape is to be bent,

b. a flexible die configured in cooperation with the rigid die member for mating intimately, along a substantial portion of the length of the shape to be bent which corresponds in extent to an increment of the length of the shape which is continuously curved after bending of the shape, with substantially the remainder of the cross-sectional configuration of the shape prior to and throughout bending of such portion of the length of the shape as bent,

c. heating means including means cooperable with the rigid die member for heating the rigid die member and, via at least the rigid die member, a shape mated to the rigid die member sufficiently to soften the shape to a plastic state in which the shape material retains a portion of its original tensile strength, and

d. means cooperable with the die member and the flexible die for forceably mating and confining a shape between the rigid die member and the flexible die over a length of the die surface defining the desired curve.

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**3,977,820**

## INJECTION MOULDING MANIFOLD

**Ludwig Beyerlein, Lenzfried; Jürgen Geibel, Sankt Mang; Otto Lachner, Kempten, and Manfred Langer, Boerwang-Nord, all of Germany, assignors to Lever Brothers Company, New York, N.Y.**

**Filed Oct. 29, 1974, Ser. No. 518,782**

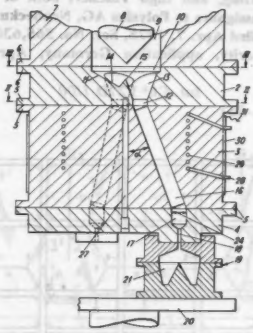
**Claims priority, application Germany, Oct. 29, 1973, 2354134**

**Int. Cl.² B29F** *1/06;* **B28B** *13/00*

**U.S. Cl. 425—247** **2 Claims**

**1.** An injection moulding manifold for dividing a main stream of thermoplastic material into a plurality of sub-

streams comprising a body member defining a main channel having at one end an inlet and at the opposite end an inwardly tapering end wall, the body having attachment means to connect the body to the output end of an extruder so that the inlet of the main channel receives the main stream of plasticized material from the extruder, said body member also defining a plurality of sub-channels having at one end thereof inlet openings in the end wall of the main channel and outlet openings at the opposite ends of the sub-channels and an injection nozzle at each of the outlet openings adapted to be connected with an injection mould said inlet openings being arranged on a common pitch circle having its centre axially aligned with the main channel, portions of the sub-channels adjacent to the main channel being defined as tapering transition passages



inwardly tapering away from the main channel, intersection edges between adjoining transition passages facing the main channel, said intersection edges being formed by adjacent transition passages intersecting with one another, the transition passages and the inwardly tapering end wall of the main channel having a vertex angle of less than 90°, at least part of the sub-channels being straight bores inclined at an angle $\alpha$ to the axis of the main channel, the ends of the inclined bores which connect with channels aligned with the main channel each being formed with an internal inwardly tapering chamfered surface generated by a line rotating about the axis of the sub-channel aligned with the main channel and inclined at an angle $\alpha$ thereto, the chamfered surface having a maximum diameter corresponding to the diameter of the adjoining channel.

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**3,977,821**

## APPARATUS FOR MAKING A PARTITIONED CONTAINER

**Walter R. Lovejoy, Elmhurst, Ill., assignor to Beatrice Foods Co., Chicago, Ill.**

**Division of Ser. No. 219,637, Jan. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 883,010, Dec. 8, 1969, which is a continuation-in-part of Ser. No. 821,238, May 2, 1969, Pat. No. 3,568,973. This application Aug. 30, 1973, Ser. No. 393,067**

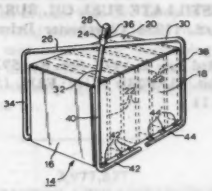
**Int. Cl.² B29F *1/00, 1/14***

**U.S. Cl. 425—249** **13 Claims**

1. An injection mold for manufacture of a container of a type having a rectangular box-like configuration with a closed bottom wall and an open top and with a plurality of partition walls extending between spaced container sidewalls and dividing said container into a plurality of cells, said mold comprising:

first mold means having four sidewalls and a transverse end wall defining a rectangular mold cavity conforming to the desired exterior dimensions of said container;

second mold means comprising a transverse end wall spaced from and parallel to said transverse end wall of said first mold means and moveable relative to said first mold means and further including a plurality of core elements affixed to one of said transverse end walls for defining, in conjunction with said first mold means and the other of said transverse end walls, a mold cavity corresponding to said container; and



gating means including a primary inlet sprue coupled to a plurality of inlet gates to said mold cavity, said inlet gates being positioned in a generally common plane adjacent the transverse end wall of said mold cavity corresponding to said open top of said container and spaced about the perimeter of said mold cavity for introducing thermoplastic material into said mold cavity to form said container.

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**3,977,822**

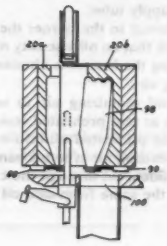
## APPARATUS FOR CONTINUOUS STRETCH-BLOW MOLDING

**Joseph R. Reilly, Naugatuck, and Leonard J. Witkowski, Windsor Locks, both of Conn., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 558,841, March 17, 1975, abandoned. This application Dec. 22, 1975, Ser. No. 642,936**

**Int. Cl.² B29D *23/03***

**U.S. Cl. 425—387 B** **11 Claims**



1. Apparatus for continuously forming molecularly oriented articles comprising:

a. a frame;

b. a support on said frame mounted for continuous rotation about a substantially vertical axis;

c. a plurality of radially partible blow molds disposed at angular intervals on said support, each mold defining a cavity;

d. means for moving said molds between open and closed positions;

e. means synchronizing said mold moving means with the rotation of said support; and

f. a plurality of stretch rod means, each permanently mounted for operation with an individual mold and operable in combination with said mold moving means and including:

i. rod positioning means for longitudinally reciprocating a rod to stretch the workpiece while within said cavity of said mold; and

ii. pressurized fluid means associated with said rod for expanding the workpiece into a formed article;

said support having a vertical container discharge chute in the vicinity of the cavity of each mold.

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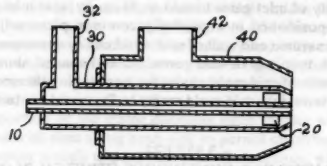
3,977,823

## METHOD OF BURNING RESIDUAL FUEL OIL IN DISTILLATE FUEL OIL BURNERS

Frank Bernhard, 11936 Claychester Drive, St. Louis, Mo. 63131

Filed July 2, 1975, Ser. No. 592,781
Int. Cl.² F23D 11/44; F23L 15/00
U.S. Cl. 431—11 15 Claims




1. A method for successfully burning residual oil in small capacity forced atomizing air type burners, comprising:

providing a source of residual oil for introduction into the burner oil supply tube;

preheating external to the burner the residual oil to a temperature such that an oil viscosity of 90 to about 150 SSU when entering the burner is obtained; providing a source of atomizing air;

heating the said atomizing air to substantially the same temperature as said preheated residual oil;

introducing said preheated oil into a central oil conduit in a forced atomizing air type oil burner;

passing the residual oil through the central oil conduit and discharging the same from said oil conduit;

passing said preheated atomizing air through a concentric conduit surrounding said oil conduit and in heat exchange relation therewith to maintain the preheated residual oil in the central conduit at substantially the same temperature as it entered said central conduit;

and discharging said preheated air from said concentric conduit to atomize said preheated residual oil into spheres or droplets; whereby said residual oil spheres or droplets can be effectively volatilized, with subsequent successful combustion of residual oil.

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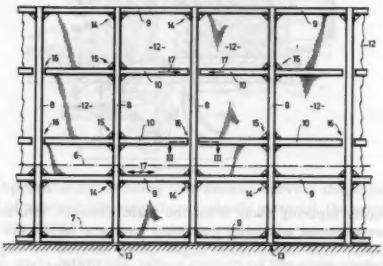
3,977,824

## TRAVELLING HEARTH HOUSING

Reinhard Korting, and Ingo Thiesler, both of Neubeckum, Germany, assignors to Polysius AG, Neubeckum, Germany

Filed Apr. 7, 1975, Ser. No. 565,630
Claims priority, application Germany, Apr. 17, 1974, 2418553
Int. Cl.² F27D 1/00
U.S. Cl. 432—251 7 Claims



1. In a housing for a travelling hearth having a plurality of longitudinally spaced vertical columns, a first group of horizontal beams of relatively low temperature loading, a second group of horizontal beams of relatively high temperature loading, and housing sheets carried by said beams, the improvement comprising means fixedly connecting the beams of said first group to all of said columns; means fixedly connecting the beams of said second group to alternate ones of said columns; and means slidably connecting the beams of said second group to the remainder of said columns.

## 3,977,825
## INDOANILINES IN KERATINIC FIBER DYE COMPOSITIONS

**Grégoire Kalopissis, Paris; Andrée Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, all of France, assignors to L'Oreal, Paris, France**

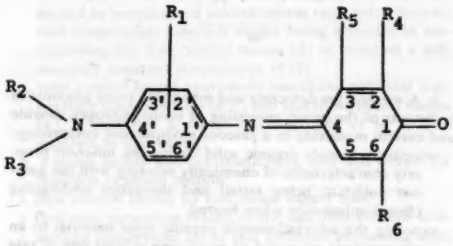
**Filed June 24, 1974, Ser. No. 482,494**

**Claims priority, application Luxemburg, June 22, 1973, 67859**

**Int. Cl.² A61K 7/13**

**U.S. Cl. 8—10.1** **15 Claims**

**1.** A dye composition for keratinic fibers comprising an aqueous or hydroalcoholic solution of an indoaniline of the formula



or a tautomeric form thereof wherein $R_1$ represents hydrogen, halogen, alkyl or alkoxy; $R_2$ and $R_3$ represent alkyl; $R_4$ and $R_5$ each independently represent hydrogen, halogen, alkyl, alkoxy, acetylamino, ureido, or carbalkoxyamino; and $R_6$ represents acetylamino, ureido carbalkoxyamino, amino, alkylamino, hydroxy alkylamino or carbamyl alkylamino, with the proviso that when $R_6$ represents acetylamino, $R_5$ does not represent hydrogen; the said alkyl and alkoxy groups containing 1–6 carbon atoms and said indoaniline being present in an amount of 0.0075 to 2 percent by weight of said composition.

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## 3,977,826
## TERPENOID STABILIZERS IN AEROSOL CO-DISPENSING HAIR COLORING SYSTEMS

**Sigmund Iscowitz, Flushing, N.Y., assignor to Clairol Incorporated, New York, N.Y.**

**Division of Ser. No. 448,130, March 4, 1974, abandoned. This application Feb. 21, 1975, Ser. No. 551,944**

**Int. Cl.² A61K 7/13**

**U.S. Cl. 8—10.2** **4 Claims**

**1.** An aerosol oxidation hair dyeing composition in an aerosol container under pressure wherein prior to release the composition is physically separated into mixtures A and B wherein:

a. mixture A comprises a stabilized aqueous hydrogen peroxide solution comprising from about 10 to 20 weight percent of hydrogen peroxide, from about 0.25 to 1.4 weight percent of at least one monoterpenoid compound wherein the chemical structure of said compound is acyclic, monocyclic or bicyclic, and water wherein the pH of mixture A is about 2.5 to 4; and

b. mixture B is an aerosol hair dye composition comprising a propellant blend and an aqueous oxidation hair dye concentrate, said concentrate containing at least one oxidation dye intermediate whose color is developable by means of an oxidizing agent, wherein the pH of mixture B is about 8 to 11.

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## 3,977,827
## PROCESS FOR DYEING ACID-MODIFIED POLYESTER FIBERS

**Seizo Konishi, Minoo; Koichi Ishii, Kobe; Sadaharu Abeta, Toyonaka, and Tetuo Okaniwa, Minoo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

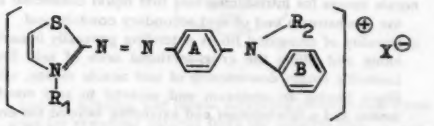
**Filed Feb. 4, 1975, Ser. No. 546,978**

**Claims priority, application Japan, Feb. 25, 1974, 49-22660**

**Int. Cl.² C09B 27/00; D06P 1/02**

**U.S. Cl. 8—41 C** **7 Claims**

**1.** A process for dyeing acid-modified polyester fibers with a cationic dye, comprising contacting said polyester fibers with a dye bath containing a cationic dye compound of the formula (I),



(I)

wherein $R_1$ and $R_2$ each is a methyl group or an ethyl group; A and B each is a benzene nucleus which can be substituted with a methyl group, an ethyl group, a methoxy group or an ethoxy group; and $X^-$ is an anion.

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## 3,977,828
## AQUEOUS DYESTUFF PREPARATIONS OF DYESTUFFS INSOLUBLE TO DIFFICULTLY SOLUBLE IN WATER

**Carl Becker, Basel; Jacques Wegmann, Bettingen, and Andres Schaub, Biel-Benken, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Filed Sept. 17, 1974, Ser. No. 506,775**

**Claims priority, application Switzerland, May 9, 1974, 6374/74; Sept. 2, 1974, 11896/74**

**Int. Cl.² C09B 67/00**

**U.S. Cl. 8—79** **18 Claims**

**1.** An aqueous stable, highly concentrated finely dispersed flowable dyestuff composition comprising at least 10% by weight of water, at least 30% by weight of at least one finely dispersed dyestuff insoluble to difficultly soluble in water having a particle size smaller than 10μ and a mixture consisting of at most 10% by weight of an anion-active dispersing agent, at most 5% by weight of a nonionic dispersing agent and at most 35% by weight of a hydrotropic agent capable of converting the dyestuff into a stable deflocculated form.

3,977,829

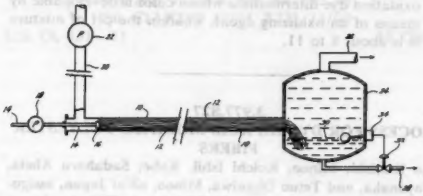
## LIQUID-LIQUID MASS TRANSFER APPARATUS

Kenyon E. Clonts, Houston, Tex., assignor to Merichem Company, Houston, Tex.

Continuation of Ser. No. 361,601, May 18, 1973, abandoned, which is a division of Ser. No. 161,068, July 9, 1971, Pat. No. 3,758,404. This application Aug. 15, 1975, Ser. No. 605,777

Int. Cl.² B01D 11/04; B01F 3/04, 3/08; C10G 17/00

U.S. Cl. 23—267 MS 6 Claims



1. Apparatus for effecting contact between a first liquid and a second immiscible liquid flowed concurrently therethrough in order to enable mass transfer therebetween, comprising:

a first conduit having an inlet and outlet, said conduit inlet being adapted to receive said second liquid and said outlet being adapted for connection with a gravity separator;

a second conduit of smaller diameter projecting into said inlet end of said primary conduit;

nozzle means for introducing said first liquid connected to the downstream end of said secondary conduit; and

a plurality of elongated fibers extending generally linearly along and filling the cross-sectional area of said first conduit's length downstream of said nozzle means, said fibers having an upstream end secured to said nozzle means and a downstream end extending beyond the end of said first conduit for immersion into separated first liquid fluid layer in said gravity separator.

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3,977,830

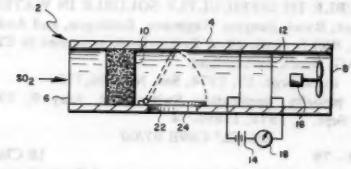
## SILVER NITRITE REACTANT FOR MEASURING $SO_2$

Leo E. Topol, Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 21, 1975, Ser. No. 560,894

Int. Cl.² G01N 31/00, 31/22, 27/00, 27/26

U.S. Cl. 23—232 R 11 Claims




9. A method of measuring the amount of sulphur dioxide contained in a gas, said method comprising the steps of:

passing said gas through a quantity of silver nitrite to allow any sulphur dioxide contained in said gas to react with said silver nitrite to form nitrogen dioxide, and

measuring the nitrogen dioxide resulting from said reaction as an indication of the presence and amount of sulphur dioxide in said gas.

3,977,831

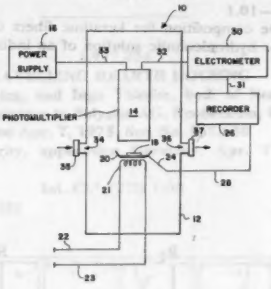
## METHOD FOR DETECTING POLLUTANTS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Robert S. Rogowski, Hampton, Va.; Ralph R. Richards, Greenville, Ill., and Edmund J. Conway, Newport News, Va.

Filed Dec. 30, 1974, Ser. No. 537,480

Int. Cl.² G01N 25/00, 27/62

U.S. Cl. 23—232 E 6 Claims




1. A method for detecting and measuring trace amounts of pollutants of the group consisting of ozone, nitrogen dioxide and carbon monoxide in a gaseous environment comprising:

selecting a sample organic solid having the inherent property characteristics of chemically reacting with the gaseous pollutant being tested and thereafter undergoing chemiluminesence when heated,

exposing the selected sample organic solid material to an environment suspected of containing at least one of said pollutants, and reacting said solid material with said one of said pollutants,

heating the reacted sample organic solid material in the temperature range of 100°–200°C. for approximately one minute,

detecting and measuring the light output from the sample solid organic material during the heating cycle,

recording the total integrated light intensity measured during the heating cycle as a concentration of the specific pollutant being tested.

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3,977,832

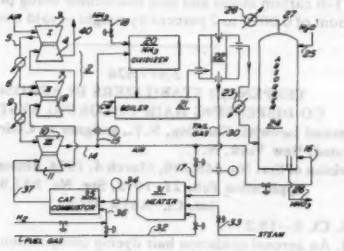
## SYSTEM FOR CONTROL OF A NITRIC ACID PLANT

William R. Schofield, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 20, 1975, Ser. No. 542,610

Int. Cl.² B01J 8/02, 8/04; C01B 21/40

U.S. Cl. 23—260 2 Claims




1. In a system for operating a chemical plant utilizing compressed process gas wherein the energy for compressing said gas is furnished at least in part by the augmented enthalpy of

a waste gas derived from such chemical plant, said system including: gas compressor means driven by gas expansion turbine means, first conduit means for conducting compressed air to a chemical processing unit, second conduit means for conveying the discharged waste gas from said chemical processing unit to said gas expansion turbine means, and means in the path of said second conduit means in advance of said turbine to raise the temperature and augment the enthalpy of said tail gas; the improved arrangement for monitoring and controlling the flow rate of the compressed process gas supplied to said chemical processing unit, said arrangement comprising:

a. a heater provided with an inlet for waste gas discharged from said chemical processing unit and a discharge conduit for heated effluent gas;
b. a fuel gas supply line for introducing combustible fuel into said heater;
c. an air supply line for introducing air for supporting combustion in said heater;
d. flow control means in (b),
e. flow control means in (c),
f. a temperature sensing means in the discharge conduit of said heater; said sensing means being operatively connected to temperature control means responsive thereto; said temperature controls means being effective in manipulating the flow control means (d) to maintain a substantially constant temperature at (f);
g. ratio control means operatively associated with said temperature control means of (f) and said flow control means (e), to maintain a preset constant ratio of air to fuel supplied to said heater;
h. a steam supply line communicating with said heater for injection of steam therein;
i. flow control means on said steam supply line;
j. flow rate measuring means in the said first conduit conducting compressed air to said chemical processing unit; and
k. means for signal communication between said flow measuring means (j) and said flow control means (i), whereby said control means (i) is responsive to variations in air flow rate measured at (j) to supply controlled quantities of steam to the heater to augment the enthalpy of the gas powering said turbine means, to the extent required to compensate deviation and to maintain the air flow rate to the chemical processing unit substantially constant.

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**3,977,833**

## APPARATUS FOR THE PRODUCTION OF FORMALDEHYDE

**Amilcare Collina; Emanuele Malfatti, and Antonio Cappelli, all of Milan, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy**

**Division of Ser. No. 359,356, May 11, 1973, abandoned. This application May 19, 1975, Ser. No. 578,816**
**Claims priority, application Italy, May 15, 1972, 24339/72**
**Int. Cl.[2] B01J** *8/02;* **C07C** *5/00*
**U.S. Cl. 23—288 K** **1 Claim**

1. An apparatus for oxidizing methanol into formaldehyde which comprises

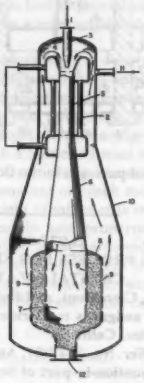
an elongated housing enclosing a space, said housing having a first substantially cylindrical end portion, a second substantially cylindrical end portion spaced longitudinally from the first end portion, and an intermediate substantially frustoconically shaped portion connecting the two end portions together,

a nozzle connected to a source of methanol and oxygen disposed longitudinally through the end of the first cylindrical portion of the housing,

a tubular member coaxial with the housing and disposed in the space enclosed by the housing, said tubular member having a first substantially cylindrical end portion substantially concentric with said first end portion of the housing, a second substantially cylindrical end portion substantially concentric with the said second end portion of the housing, and a substantially frustoconical intermediate portion which is substantially concentric with the said intermediate portion of the housing, and a plurality of orifices in said second end portion of the tubular member for flow of gas therefrom,

said tubular member having an open end flared outwardly disposed about the nozzle,

an annular centrifugal catalyst basket disposed about the second end portion of the tubular member and spaced radially inwardly of the adjacent part of the housing, a plurality of orifices in the basket for flow of gases from the catalyst bed into space between the catalyst basket



and the housing, and means extending through said housing for removing catalyst from the catalyst bed,

a cooling means disposed about the first cylindrical end portion of the tubular member and means for circulating a cooling fluid through the cooling means,

and an outlet for flow of gas from the space enclosed by the housing disposed adjacent to said nozzle whereby gas introduced into the apparatus through the nozzle flows through the tubular member through the catalyst into space about the tubular member and longitudinally back to the outlet and a portion of the gas flowing towards the outlet is drawn by gas emerging from the nozzle into the tubular member for recycle through the catalyst.

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**3,977,834**

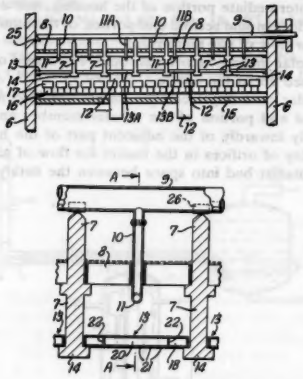
## MULTI-BED, MIXED-PHASE, DOWN-FLOW REACTOR

**Leslie Alcock, Bexleyheath, and Terence Michael Lazenby, Bagshott, both of England, assignors to The British Petroleum Company Limited, London, England**

**Filed Nov. 22, 1974, Ser. No. 526,398**
**Claims priority, application United Kingdom, Dec. 7, 1973, 56743/73**
**Int. Cl.[2] B01J** *8/04;* **B01F** *3/04*
**U.S. Cl. 23—288 R** **12 Claims**

1. A multi-bed, mixed phase, down-flow reactor containing cross beams for supporting a grid for supporting each catalyst bed and containing gas/liquid transfer plates characterized in that the horizontal spaces between the cross beams contain a device suitable for mixing and redistributing reactants between the beds, which device comprises means for injecting gas into the reactor having a number of parallel, perforated pipes extending horizontally across the width of the reactor beneath a pipe and above a gas/liquid transfer plate, and a number of quench boxes also extending across the width of the reactor, the quench boxes having an inner and two outer

compartments, passages in the roof of the outer compartments, passages through the walls between the inner and outer



compartments, and passages in the floor of the inner compartments.

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**3,977,835**

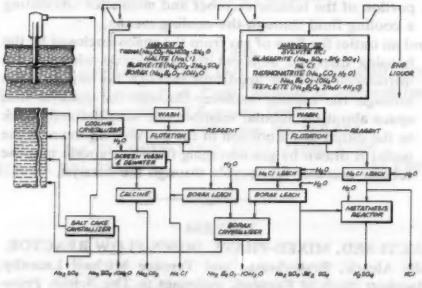
## COOLING PROCESS FOR SELECTIVE SALT CRYSTALLIZATION

**Elie M. Chemtob, Claremont, and Roland V. Marcote, Reseda, both of Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.**

**Continuation of Ser. No. 284,087, Aug. 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 16,171, March 3, 1970, abandoned. This application Dec. 13, 1974, Ser. No. 532,737**

**Int. Cl.² B01D** *9/02*; **C01C** *1/30, 5/00, 3/06*

**U.S. Cl. 23—296** **8 Claims**



**1.** A cooling process for the recovery of readily processable salt groupings from a complex brine containing potassium, sodium, chloride, sulfate and borate ions which comprises the sequential steps of:

a. artificially cooling a brine containing potassium ion in an amount up to about 3% by weight, carbonate ion in an amount of from about 2.5 to about 4.5% by weight, sulfate ion in an amount of from about 3.0 to about 6.0% by weight and borate ion in an amount of from about 0.6 to 1.2% by weight, based on the weight of the brine, the balance of the ionic species being sodium ion and chloride ion in two artificial cooling stages, the brine being cooled in the first artificial cooling stage to about 2°C to recover mirabilite substantially free of borax and natron from which mirabilite is separated and then in a second cooling stage where the brine is cooled to a temperature between about 2°C and about −20°C to obtain a salt grouping consisting essentially of mirabilite, borax and natron and free of potassium salts and recovering the salt grouping from the second cooling stage to leave a resultant brine;

b. concentrating the resultant brine in a first solar evaporator stage to crystallize a grouping of sodium salts, said grouping of sodium salts being substantially free of potassium salts and containing burkeite in an amount up to 30% by weight, the balance being halite;

c. concentrating the resultant brine from the first solar evaporation stage in a second solar evaporation stage to crystallize a group of salts of the following composition: halite from about 25 to about 30% by weight, glaserite from about 2 to about 15% by weight, sylvite from about 12 to about 45% by weight, thermonatrite from about 10 to about 20% by weight, borax from about 3 to about 5% by weight, teepleite from about 7 to about 15% by weight and trona from about 3 to about 8% by weight based on total weight of salts deposited in the second solar evaporation stage.

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**3,977,836**

## METHOD AND APPARATUS FOR DETERMINING AMMONIA CONCENTRATION OF GAS

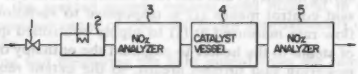
**Shimpei Matsuda; Fumito Nakajima, both of Hitachi; Masato Takeuchi, Katsuta; Shigeo Uno; Akira Kato, both of Hitachi; Makoto Imanari, and Yoshihisa Watanabe, both of Ibaraki, all of Japan, assignors to Hitachi, Ltd.; Mitsubishi Petrochemical Company Limited and Babcock-Hitachi K.K., all of Japan**

**Filed Nov. 12, 1975, Ser. No. 631,198**

**Claims priority, application Japan, Nov. 13, 1974, 49-129943**

**Int. Cl.² G01N** *25/22, 21/58, 21/12*

**U.S. Cl. 23—232 R** **13 Claims**




**1.** A method for determining an ammonia concentration in a gas, which comprises contacting ammonia and nitrogen oxides in moles more than moles of the ammonia with a catalyst capable of promoting reaction of ammonia and nitrogen oxides to form nitrogen and water in an oxidative atmosphere at an elevated temperature, measuring concentrations of nitrogen oxides before and after the contact with the catalyst, and calculating an ammonia concentration from the measured concentrations of nitrogen oxides.

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**3,977,837**

## TITANIUM CARBIDE TOOL STEEL HAVING IMPROVED PROPERTIES

**M. Kumar Mal, Spring Valley, and Stuart E. Tarkan, Monsey, both of N.Y., assignors to Chromalloy American Corporation, New York, N.Y.**

**Filed Nov. 6, 1973, Ser. No. 413,332**

**Int. Cl.² C22C** *29/00, 1/04, 1/05, 33/02*

**U.S. Cl. 29—182.7** **40 Claims**

**1.** A sintered steel-bonded titanium carbide composition characterized by an improved combination of physical and anti-friction properties which comprises, about 15 to 60% by weight of primary grains of titanium carbide dispersed through a steel matrix making up essentially the balance, said steel matrix being characterized metallographically by an austenitic decomposition product and containing a small but effective amount of misch metal ranging from about 0.1% to 1.25% by weight of said matrix, said sintered titanium carbide composition in the hardened condition being characterized by substan-

tial improvement in transverse rupture strength and improved resistance to wear and to galling as evidenced by a substantial decrease in the coefficient of friction.

6. A sintered steel-bonded titanium carbide composition characterized by an improved combination of physical and anti-friction properties which comprises, about 15 to 60% by weight of primary grains of titanium carbide dispersed through a steel matrix making up essentially the balance, said steel matrix being characterized metallographically by an austenitic decomposition product and containing a small but effective amount of misch metal ranging from about 0.1 to 1.25% by weight of said matrix sufficient to effect an improvement in said properties, said steel matrix being selected from the group consisting of:

A. a matrix containing by weight about 1 to 6% Cr, up to about 6% Mo, up to about 2% vanadium, up to about 3% cobalt, up to 2% nickel, about 0.3 to 0.8% C and the balance essentially iron,

B. a matrix containing by weight about 6 to 12% Cr, about 0.5 to 5% Mo, about 0.6 to 1.2% C, up to about 5% W, up to about 2% V, up to about 3% Ni, up to about 5% Co and the balance essentially iron; and

C. a matrix comprising a high nickel alloy containing by weight about 10 to 30% Ni, about 0.2 to 9% Ti, up to about 5% Al, the sum of Ti and Al content not exceeding about 9 percent, less than about 0.15% C, up to about 25% Co, up to about 10% Mo, substantially the balance of the matrix being at least about 50% iron, the metals making up the matrix composition being proportioned such that when the nickel content ranges from about 10 to 22 percent and the sum of Al and Ti is less than about 1.5 percent, the molybdenum and cobalt contents are each at least about 2 percent, and such that when the nickel content ranges from about 18 to 30 percent and the molybdenum content is less than 2 percent, the sum of Al and Ti exceeds 1.5 percent,

said sintered titanium carbide composition in the hardened condition being characterized by substantial improvement in transverse rupture strength and improved resistance to wear and galling as evidenced by a substantial decrease in the coefficient of friction.

11. A hardened, wear resistant, sintered steel-bonded titanium carbide composition characterized by an improved combination of physical and anti-friction properties which comprises, about 15 to 60% by weight of primary grains of titanium carbide dispersed through a hardened steel matrix characterized by the presence of martensite, said steel matrix containing a small but effective amount of misch metal ranging from about 0.1 to 1.25% by weight of said matrix sufficient to effect a substantial improvement in said properties, said sintered titanium carbide composition in the hardened condition being characterized by substantial improvement in transverse rupture strength and improved resistance to wear and galling as evidenced by a substantial decrease in the coefficient of friction.

14. A hardened, wear resistant, sintered steel-bonded titanium carbide composition characterized by an improved combination of physical and anti-friction properties which comprises, about 15 to 60% by weight of primary grains of titanium carbide dispersed through a hardened steel matrix making up essentially the balance, said steel matrix being characterized by the pressure of martensite, said steel matrix containing a small but effective amount of misch metal ranging from about 0.1 to 1.25% by weight of said matrix sufficient to effect a substantial improvement in said properties, said steel matrix being selected from the group consisting of:

A. a matrix containing by weight about 1 to 6% Cr, up to about 6% Mo, up to about 2% vanadium, up to about 3% cobalt, up to 2% nickel, about 0.3 to 0.8% C and the balance essentially iron;

B. a matrix containing by weight about 6 to 12% Cr, about 0.5 to 5% Mo, about 0.6 to 1.2% C, up to about 5% W, up to about 2% V, up to about 3% Ni, up to about 5% Co and the balance essentially iron; and

C. a matrix comprising a high nickel alloy containing by weight about 10 to 30% Ni, about 0.2 to 9% Ti, up to about 5% Al, the sum of Ti and Al content not exceeding about 9 percent, less than about 0.15% C, up to about 25% Co, up to about 10% Mo, substantially the balance of the matrix being at least about 50% iron, the metals making up the matrix composition being proportioned such that when the nickel content ranges from about 10 to 22 percent and the sum of Al and Ti is less than about 1.5 percent, the molybdenum and cobalt contents are each at least about 2 percent, and such that when the nickel content ranges from about 18 to 30 percent and the molybdenum content is less than 2 percent, the sum of Al and Ti exceeds 1.5 percent.

said sintered titanium carbide composition in the hardened condition being characterized by substantial improvement in transverse rupture strength and improved resistance to wear and galling as evidenced by a substantial decrease in the coefficient of friction.

19. As an article of manufacture, a wear resistant element formed from a hardened, sintered steel-bonded titanium carbide composition characterized by an improved combination of physical and anti-friction properties which comprises, about 15 to 60% by weight of primary grains of titanium carbide dispersed through a hardened steel matrix characterized by the presence of martensite, said steel matrix containing a small but effective amount of misch metal ranging from about 0.1 to 1.25% by weight of said matrix sufficient to effect a substantial improvement in said properties, said sintered titanium carbide composition in the hardened condition being characterized by substantial improvement in transverse rupture strength and improved resistance to wear and galling as evidenced by a substantial decrease in the coefficient of friction.

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**3,977,838**

## ANTI-WEAR FERROUS SINTERED ALLOY

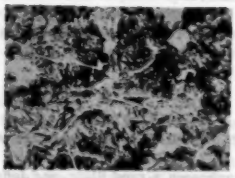
**Kametaro Hashimoto; Kenji Ushitani; Masashi Shibata; Yasuo Takeda, and Yoshitaka Takahashi, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed June 11, 1974, Ser. No. 478,324**

**Claims priority, application Japan, June 11, 1973, 48-65579**

**Int. Cl.[2] B22F *3/00*; C22C *1/05*, *33/02***

**U.S. Cl. 29—182.5** **8 Claims**



( 400)

1. Anti-wear ferrous sintered alloy consisting essentially of 0.5–2.0% carbon, 3–18% molybdenum, 0.8–3.0% phosphorus, 0.02–0.3% boron, and 0–10% copper, by weight, with the balance substantially all iron.

3,977,839

## COATED METAL ARTICLE AND METHOD OF COATING

Stephen P. Palisin, Jr., Cleveland, Ohio, assignor to The Empire Plating Company, Cleveland, Ohio

Division of Ser. No. 418,114, Nov. 21, 1973, which is a continuation-in-part of Ser. No. 200,224, Nov. 18, 1971, Pat. No. 3,790,355, which is a continuation of Ser. No. 887,397, Dec. 22, 1969, abandoned. This application Oct. 6, 1975, Ser. No. 619,832

Int. Cl.² B32B *15/04*

U.S. Cl. 29—195 5 Claims

4. A metal article composed of a metal selected from the group of metals consisting of aluminum, brass, copper alloys, zinc, and ferrous metals, having an electrodeposited coating on a surface thereof selected from the group of metals consisting of zinc, cadmium, nickel and chromium, said electrodeposited coating have a chromated surface formed by being treated for between about 15 seconds and about 25 seconds with water containing between about 6 oz. and about 16 oz. per gallon of a liquid composed of about 90% of $CrO_3$ and about 10% of sodium bisulfate followed by rinsing the chromated surface with water, and a film of hydrophobic thermosetting polymer formed from a plurality of coats of said polymer and adhering to said chromated surface, which coats have been concurrently hardened by heating the article to above about 300°F.

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3,977,840

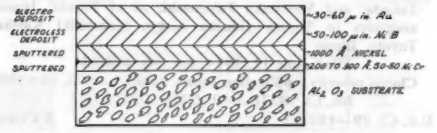
## SOLDERABLE THIN FILM MICROCIRCUIT WITH STABILIZED RESISTIVE FILMS

Gordon J. Estep, Agoura, and Bernard Lee Burton, Simi, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.

Division of Ser. No. 507,184, Sept. 9, 1974, Pat. No. 3,904,461, which is a continuation of Ser. No. 293,988, Oct. 2, 1972, abandoned. This application May 2, 1975, Ser. No. 574,651

Int. Cl.² B32B *15/04*

U.S. Cl. 29—195 5 Claims




1. A hybrid microcircuit board comprising:
a substrate of high-temperature insulating material,
a resistive layer of nickel-chromium deposited on said substrate,
a film of nickel deposited on said nickel-chromium layer, and
a layer of nickel-boron deposited on said nickel layer,
said microcircuit board being heat-treated to stabilize said resistive layer.

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3,977,841

## RUTHENIUM POWDER METAL ALLOY AND METHOD FOR MAKING SAME

Gregory K. Rasmussen, Grand Blanc, and John Hrinevich, Jr., Flint, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 2, 1974, Ser. No. 493,873

Int. Cl.² B22F *3/00*; C22C *33/00*, *19/00*, *5/02*

U.S. Cl. 29—182 5 Claims

1. A sintered powder metal alloy containing, by weight, about 70 to 80% ruthenium dispersed in a matrix of about 20–30% of a pre-alloyed composition consisting essentially of, by weight, about 44–63% cobalt, about 16–22% chromium, about 0–5% tungsten, about 6–10% silicon and about 15–19% nickel, the surface of said ruthenium powder being soluble in said pre-alloyed composition for ductility and having good oxidation and spark erosion resistance at temperatures as high as about 2000° F., said ruthenium being present essentially in the form of grains dispersed in and metallurgically bonded at the surface to said cobalt base alloy matrix.

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3,977,842

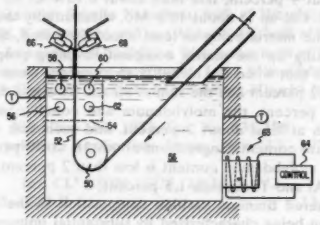
## PRODUCT AND PROCESS

John T. Mayhew, Toronto, Ohio, assignor to National Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 757,522, Aug. 27, 1968, abandoned, which is a continuation of Ser. No. 375,264, June 15, 1964, abandoned. This application June 16, 1970, Ser. No. 46,825

Int. Cl.² C23C *1/02*

U.S. Cl. 29—196.5 24 Claims




1. Continuous-strip method for producing coated steel strip comprising
a. forming a molten galvanizing bath containing aluminum additions up to 0.30% by weight,
b. introducing heated steel strip into the molten galvanizing bath, the strip entering the bath being at a temperature higher than the temperature of the molten spelter in the bath thereby adding heat to the bath,
c. maintaining molten galvanizing spelter in the bath at a temperature of approximately 890°F. to approximately 950°F.,
d. moving the heated strip through the bath toward an exit side of the bath,
e. forming an iron-zinc alloy coating on the moving strip by contacting the moving strip with molten spelter at a temperature of approximately 890°F. to approximately 950°F.,
f. delivering the strip from the exit side of the bath, the delivered strip having an inner iron-zinc alloy coating and an outer molten galvanizing spelter coating,
g. directing gas under pressure against at least one side of the coated steel strip upon delivery of the coated steel strip from the molten galvanizing bath to remove the molten galvanizing spelter coating from the iron-zinc alloy coated steel strip on the one side,
h. subjecting a portion of the molten galvanizing spelter in the bath to heat exchange contact with a cooling fluid to cool said portion of the bath, the cooled portion of the bath being located at the strip exit side of the bath, and
i. delivering the steel strip from the molten galvanizing bath upon passage through the cooled portion.

3,977,843

## PURIFICATION PROCESS FOR COAL GAS METHANATION

John N. Dew; Burton M. Casad; Eugene A. Harlacher, all of Ponca City, Okla., and Joseph A. Kleinpeter, McMurray, Pa., assignors to Continental Oil Company, Ponca City, Okla.

Filed Dec. 5, 1975, Ser. No. 637,918
Int. Cl.² C10K 1/00
U.S. Cl. 48—197 R 4 Claims

1. A process for preventing high temperature methanation runaways in a hydrodesulfurization reactor comprising;

a. removing essentially all carbon dioxide and sulfur from coal gas feed streams entering the reactor, the remaining sulfur being insufficient to prevent said high temperature methanation runaways;

b. supplementing the remaining streams with carbon dioxide prior to entering the reactor; and

c. maintaining the carbon dioxide level of the stream entering the hydrodesulfurization reactor at a level sufficient to prevent significant methanation based on said sulfur remaining in the feed streams.

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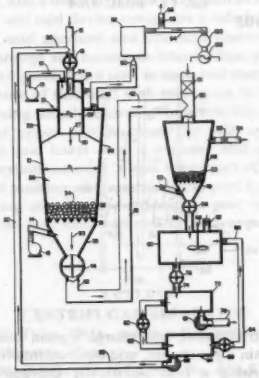
3,977,844

## PROCESS FOR PRODUCING A SULFUR FREE COMBUSTIBLE GAS

William J. Van Slyke, 2549 Harris Ave., Richland, Wash. 99352

Filed May 9, 1973, Ser. No. 358,506
Int. Cl.² C10J 3/16, 3/54
U.S. Cl. 48—202 4 Claims



1. A process for producing hot gas having 10 to 400 BTU/ft³ content and devoid of sulfur, halogens and particulate matter comprising the steps of:

I. reacting at 750° to 850°C a sulfur-bearing coal, air, steam, and, a metal compound selected from the group consisting of sodium oxide, sodium hydroxide, sodium bicarbonate, sodium carbonate and mixtures thereof, to produce sodium sulfide, wherein

A. the atomic ratio of oxygen present in air to carbon in coal is between 1:1 and 1:3, and

B. the atomic ratio of metal in the metal compound to sulfur in coal is not less than 2:1,

II. reacting the sodium sulfide produced from Step I with additional coal, additional air and steam at 200° to 650°C to regenerate sodium carbonate, wherein

A. the atomic ratio of carbon in coal to oxygen in air is between 1:1 and 3:1, and

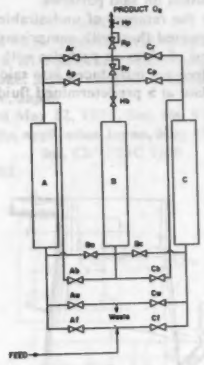
B. the molar ratio of the sodium sulfide to carbon in the coal is between 1:3 and 1:10.

3,977,845

## ADSORPTIVE PROCESS FOR SELECTIVE SEPARATION OF GASES

William Clarence Walter, 2 Westway, Rochester, N.Y. 14624

Filed June 20, 1975, Ser. No. 588,707
Int. Cl.² B01D 53/04
U.S. Cl. 55—25 12 Claims




1. In a pressure swing process for fractionating at least one component from a gaseous mixture by selective adsorption in each of at least two adsorption zones by sequentially passing the gaseous mixture from a feed stream through a first adsorption zone until low purity product gas is obtained while simultaneously purging and then pressurizing a second adsorption zone and then through the second adsorption zone until low purity product gas is obtained while simultaneously purging and then pressurizing the first adsorption zone, the improvement comprising selectively collecting product quality gas and low purity gas which is not of product quality in a segregated storage adsorption zone: selectively passing the product quality gas collected in the segregated storage adsorption zone from one end of the segregated storage adsorption zone as countercurrent purge gas to at least contribute to the purge gas used to remove components adsorbed in the beds of the adsorption zones; and selectively diverting the low purity gas collected in the segregated storage adsorption zone from the other end of the segregated storage adsorption zone as repressurizing gas to an adsorption zone after said adsorption zone has been purged with a countercurrent flow of purge gas at least part of which was contributed by gas from the segregated storage adsorption zone to at least contribute to the repressurization of that particular adsorption zone, said segregated storage adsorption zone never being exposed directly to the feed gas stream during the fractionation cycles.

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3,977,846

## ANTI-POLLUTION METHOD

Allen S. Russell, New Kensington; Noel Jarrett, Lower Burrell; Marshall J. Bruno, Greensburg; John A. Remper, Lower Burrell, all of Pa., and Larry K. King, Maryville, Tenn., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 291,060, Sept. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 178,079, Sept. 7, 1971, Pat. No. 3,811,916. This application Aug. 20, 1973, Ser. No. 388,881
Int. Cl.² B01D 53/06
U.S. Cl. 55—79 9 Claims

1. A process for the prevention of pollution by the removal of undesirable hydrocarbons from a gas which comprises:

a. fluidizing solid particles with a fluidizing medium substantially free of hydrocarbons depositable on the particles;

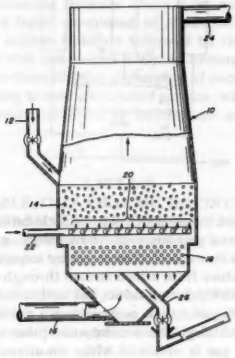
b. cooling the particles to a temperature not exceeding the condensation temperature of said hydrocarbons;

c. introducing said hydrocarbon-contaminated gas at a point spaced from the entry point of said fluidizing medium and at a temperature exceeding the condensation temperature of said hydrocarbons; and

d. removing said hydrocarbons from said contaminated gas through deposition on said particles.

9. A process for the removal of undesirable hydrocarbons from a gas contaminated therewith comprising:

a. fluidizing a bed of alumina particles with a substantially hydrocarbon-free gas introduced into said bed through a distribution plate at a predetermined fluidizing velocity;



b. cooling the bed to a temperature of less than about 125°C;

c. introducing said hydrocarbon-contaminated gas at a point spaced from said distribution plate through a nozzle maintained at a temperature above the condensation temperature of said hydrocarbons by heating or insulating said nozzle, said gas being introduced into the zone of fluidized particles at a velocity sufficient to prevent counterflow of the particles;

d. removing said hydrocarbons from said contaminated gas through deposition on said alumina particles.

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**3,977,847**

## FILTRATION METHOD AND APPARATUS

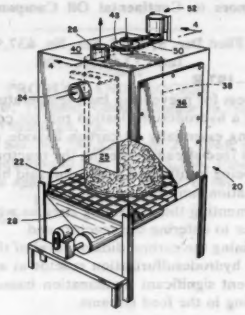
**Raymond C. Clark, Lake Forest, Ill., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Aug. 8, 1975, Ser. No. 603,083**
**Int. Cl.² B01D *46/04***
**U.S. Cl. 55—96** **23 Claims**

1. A method of removing particles from a stream of gas comprising:

passing the gas through a depth filter comprising a porous fabric made essentially solely of metal and including base and pile connected to said base, said pile being made from metal fibers having a diameter of less than 50 microns, said pile fibers being flexible and free to move relative to each other, and

cleaning the depth filters to remove particles entrapped in the pile fibers by passing cleaning gas through the filter in a direction counter to the direction said particle laden gas flows through the fliter, said pile fibers lying down upon each other to form the depth filter as the particle laden gas impinges against the pile fibers and opening and extending outwardly from the base permitting entrapped particles or particle agglomerates to be entrained by the



cleaning gas and carried out of the filter as the cleaning gas flows through the fabric.

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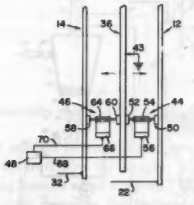
**3,977,848**

## ELECTROSTATIC PRECIPITATOR AND GAS SENSOR CONTROL

**Kenward S. Oliphant, San Francisco, Calif., assignor to CRS Industries, Inc., Tampa, Fla.**

**Filed Apr. 15, 1974, Ser. No. 460,890**
**Int. Cl.² B03C *3/04***
**U.S. Cl. 55—105** **22 Claims**



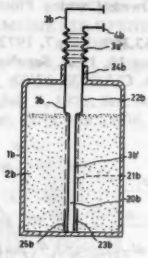
1. An electrodynamic gas charge system configured for operation within a gas stream, said electrodynamic gas charge system comprising a first electrically charged element, a screen element connected to ground so as to be at a lower potential than said first electrically charged element, signal generator means comprising a first output signal generator to generate a first output voltage signal, said first electrically charged element electrically interconnected to said first output signal generator to receive and be electrically charged by said first output voltage signal, said first electrically charged element and said screen element constructed and arranged relative to each other to develop a first voltage gradient field therebetween to ionize and agglomerate particles in the gas stream, sensor means to measure parameters of the gas stream that increase relative to the level of ionization, said sensor means disposed in communicating relationship with the gas stream and including means to generate an output signal proportional to the difference of the measured parameters and a preselected standard control means electrically connected to said sensor means, said control means connected to said first electrically charged element and disposed to vary said first voltage gradient field upon receipt of an output signal from said sensor means, whereby maximum ionization is allowed without exceeding said preselected standards.

3,977,849

## SORPTION PUMP

Jan Visser, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 352,583, April 19, 1973, Pat. No. 3,868,239. This application Dec. 6, 1974, Ser. No. 530,166
Claims priority, application Netherlands, Jan. 29, 1973, 7301204
Int. Cl.² B01D 53/04
U.S. Cl. 55—389 3 Claims



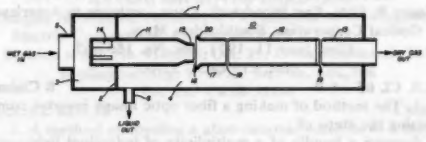
1. In a sorption pumping device connectible to a space to be evacuated, the device including a housing which when upright has upper and lower parts with walls which define therein a reservoir containing a quantity of sorption material to be situated in said reservoir at corresponding, vertically-spaced upper and lower elevations therein, the improvement in combination therewith wherein said housing includes and aperture in said walls, and a blocking member in each of said upper and lower parts, and said device comprises a tubular duct extending through said aperture and into said reservoir defining a bore therethrough and having an intermediate part and upper and lower end parts, and a port in each end part communicating via the bore of said duct with said space to be evacuated, said duct being axially movable between the first position wherein said upper port is closed by said upper blocking member and said lower port is exposed and communicates with said sorption material in said lower part of the reservoir, and a second position wherein said lower port is closed by said lower blocking member and said upper port is exposed and communicates with said material in said upper part of the reservoir.

3,977,850

## CENTRIFUGAL SEPARATOR

Ernest C. Hill, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Feb. 17, 1976, Ser. No. 658,210
Int. Cl.² B01D 45/12
U.S. Cl. 55—419 6 Claims



1. For use in a liquid-gas separator, a vortex tube assembly for processing gas which is mixed with entrained liquid in drops of 5 micron and larger, including,

an inlet section of pipe closed at the extreme end and having a length of 6D and adapted to receive the mixture,

a vortex pipe axially aligned with the inlet section of pipe and spaced from the inlet section to define a gap and having a length of 10D,

an outlet pipe axially aligned with the inlet and vortex pipe and spaced from the vortex pipe to define a gap,

a plurality of nozzles mounted on the inlet section of pipe to receive the gas and entrained liquid and direct the fluid mixture tangent to the internal diameter of the pipe,

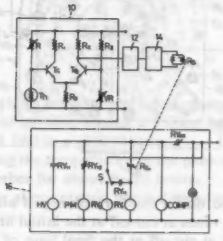
and an ejector nozzle on the exit end of the inlet section of pipe formed by reducing the cross section of the pipe.

3,977,851

## AUTOMATIC ELECTRONIC ICE-MAKING CONTROL SYSTEM FOR AUTOMATIC ICE-MAKING MACHINE

Ko Toya, Toyoake, Japan, assignor to Hoshizaki Electric Co., Ltd., Toyoake, Japan

Filed May 12, 1975, Ser. No. 576,864
Claims priority, application Japan, May 17, 1974, 49-55082
Int. Cl.² F25C 1/00
U.S. Cl. 62—135 3 Claims



1. In an ice forming system for ice-making machines having an ice-making chamber, an electronic control circuit for making uniform quantities of ice irrespective of atmospheric ambient temperature changes and comprising a voltage source, a differential amplifier supplied by said voltage source and having as its input a voltage tapped from the junction of series connected first and second temperature responsive elements the free ends of which are connected to said voltage source, one only of said temperature responsive elements being within said ice-making chamber for detecting temperature changes therein, the other temperature responsive element being exposed to the atmosphere for sensing atmospheric ambient temperature changes, both temperature responsive elements translating temperature changes into impedance changes, the impedance change of the second temperature responsive element with ambient temperature changes being effective to modify the temperature at which the first temperature responsive element is effective to produce a predetermined input voltage of sufficient magnitude to cause conduction of said differential amplifier.

3,977,852

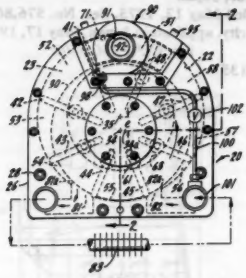
## COMPRESSOR-EXPANDER WITH VOLUME COMPENSATION

Thomas C. Edwards, Casselberry, Fla., assignor to The Revac Corporation, Maitland, Fla.

Filed Apr. 2, 1975, Ser. No. 564,439
Int. Cl.² F25D 9/00
U.S. Cl. 62—402 37 Claims

1. In an air conditioning unit for cooling a space, the combination comprising, a frame having an enclosed cylindrical chamber, a cylindrical rotor mounted in said frame for rotation about the central axis of said rotor, said central axis of rotation being eccentric relative to said cylindrical chamber, means for driving the rotor, vanes spaced about the rotor periphery and having their outer edges extending into functional engagement with the wall of said chamber to define a series of compartments which vary in volume upon rotor rotation through volumetric stages which are (a) maximum, (b) convergent, (c) minimum, and (d) divergent, the frame

having inlet and outlet ports leading to said cylindrical chamber arranged at substantially equal radii and spaced for simultaneous communication with successively presented compartments at the maximum stage, means including an air pump for inducing flow of warm air through the inlet port to charge each successively presented compartment with warm air while blowing out cold air from such compartment through the outlet port substantially independently of centrifugal force, the frame having peripherally spaced heat exchanger ports near the final and initial limits of the convergent and divergent stages, respectively, a heat exchanger connected between the heat exchanger ports, the heat exchanger ports and rotor axis



being so located that a smaller volume of air is defined between adjacent vanes at cut-off at the initial limit of the divergent stage than at cut-off at the final limit of the convergent stage, so that the warm air introduced through the inlet port is (1) compressed accompanied by increase in temperature through the convergent stage, (2) discharged to the heat exchanger, (3) pumped through the heat exchanger at substantially constant pressure, (4) reintroduced as cooled compressed air, (5) expanded and cooled through the divergent stage, and (6) scavenged as cold air through the outlet port, and conduit means for conducting cold air from said outlet port to the space to be cooled.

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**3,977,853**

## REFRIGERATOR WITH AN ABSORPTION REFRIGERATING APPARATUS

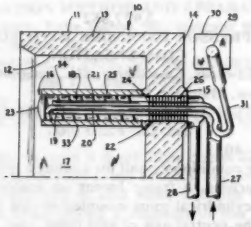
**Nicolas Eber, Unterengstringen, Switzerland, assignor to Sarlab Aktiengesellschaft, Zurich, Switzerland**

**Filed Sept. 9, 1974, Ser. No. 504,126**

**Claims priority, application Sweden, Sept. 11, 1973, 7312311**

**Int. Cl.² F25B *15/10***

**U.S. Cl. 62—491** **9 Claims**



1. In an absorption refrigeration apparatus operating with an inert gas and having an insulated cabinet forming a cooling chamber and an evaporator system, said cabinet being provided with at least two openings therein, the improvement comprising: an evaporator pipe extending generally linearly and horizontally in said cooling chamber, and a gas heat exchanger being co-axial and linearly co-extensive with said evaporator pipe, said heat exchanger having a plurality of spaced, pin-like elements at least partially surrounding a portion of said evaporator pipe located in said refrigerator insulation, said evaporator pipe being inserted through one of said openings in the cabinet and into said cooling chamber.

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**3,977,854**

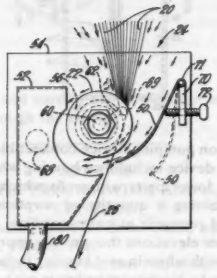
## APPARATUS FOR AND METHOD OF COATING GLASS FIBERS

**Ray M. Fulmer, and Raymond L. Lochlear, Jr., both of Aiken, S.C., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Division of Ser. No. 263,369, June 7, 1972, abandoned. This application June 10, 1974, Ser. No. 477,880**

**Int. Cl.² C03B *37/02***

**U.S. Cl. 65—3 R** **7 Claims**



1. The method of treating glass filaments comprising:

supplying streams of molten glass;

withdrawing spaced apart continuous glass filaments from the streams;

advancing the continuous glass filaments along converging paths to a gathering surface, the advancing filaments moving air with them;

applying coating liquid to the filaments during advancement to the surface;

gathering the advancing filaments into a linearly advancing strand by turning them on the surface; and

removing any excess coating from the strand by impinging at least a portion of such moving air upon a deflecting surface located immediately adjacent, opposite and below the gathering surface, the deflecting surface being oriented in a position effective to deflect impinged air below the gathering surface in a direction generally transversely across the strand with sufficient energy to effect removal of excess liquid from the strand.

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**3,977,855**

## METHOD OF MAKING FIBER OPTIC DEVICE

**Henry B. Cole, East Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.**

**Filed June 11, 1971, Ser. No. 155,667**

**Int. Cl.² C03C *23/00***

**U.S. Cl. 65—4 B** **8 Claims**

1. The method of making a fiber optic image inverter comprising the steps of:

forming a bundle of a multiplicity of individual light-conducting fibers arranged in side-by-side parallel relationship with each other and all fused together with corresponding opposite ends of the fibers substantially geometrically identically patterned as opposite image-receiving and image-emitting end faces of the bundle, said bundle being substantially longer than the ultimate finished length of said image inverter;

heating a major portion of the length of said bundle intermediately of said opposite faces thereof to a softening temperature suitable for axial twisting thereof;

axially twisting said bundle sufficiently to invert one of said end faces 180° relative to the other end face;

compressing said bundle axially an amount sufficient to substantially shorten its length between said opposite end faces; and

cooling said bundle to a hardened state;

said step of compressing being effected at any preselected stage of processing between said steps of heating and cooling said bundle.

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**3,977,856**

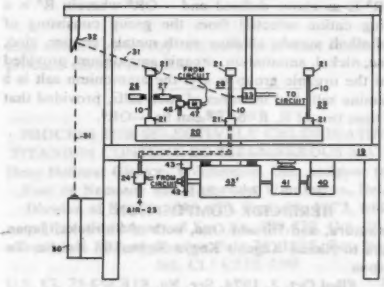
## CLINICAL THERMOMETER OPENING APPARATUS AND METHOD

**Harvey Rosen, New York, N.Y., assignor to Kaye Thermometer Corporation, Brooklyn, N.Y.**

**Filed July 7, 1975, Ser. No. 593,695**

**Int. Cl.² C03B *23/08, 23/10***

**U.S. Cl. 65—29** **12 Claims**



1. A method for making an opening in the bore of a glass tubing portion in the manufacture of a glass clinical thermometer, comprising the steps of directing a narrow light beam at the glass tubing portion so as to form on the sensitive surface of a photosensor a diffraction image of the glass tubing bore, thereby producing a certain electrical output from the photosensor, heating the glass tubing portion to soften the glass, establishing fluid pressure in the tubing bore causing the bore to widen at the softened glass and causing a change in the diffraction image formed by the light beam and thus varying the electrical output from the photosensor, and utilizing the varied electrical output to control the fluid pressure to cause the widened bore to assume a desired size.

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**3,977,857**

## METAL BONDING GLASS-CERAMIC COMPOSITIONS HAVING IMPROVED HARDNESS

**Douglas M. Mattox, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 410,655, Oct. 29, 1973, abandoned. This application Aug. 7, 1975, Ser. No. 602,706**

**Int. Cl.² C03B *32/00***

**U.S. Cl. 65—33** **7 Claims**

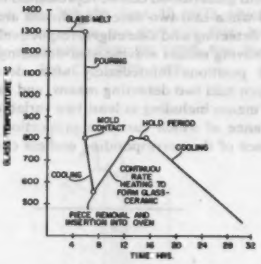
1. A method of bonding a glass-ceramic material to a metal member comprising the steps of:

A. forming a fluid glass composition consisting essentially of about 60 to 80 weight percent $SiO_2$, 12 to 20 weight percent $Li_2O$, 2 to 14 weight percent MgO, 1.5 to 6 weight percent $P_2O_5$, 1 to 7 weight percent of an alkali oxide selected from the group consisting of $K_2O$ and $Na_2O$ and their mixtures, 0 to 2 weight percent of a transition metal oxide selected from the group consisting of $Co_3O_4$, $MnO_2$, $Fe_2O_3$, $V_2O_5$ and $WO_3$ and their mixtures, 0 to 5 weight percent PbO, 0 to 2 weight percent $Al_2O_3$ and 0 to 1 weight percent $As_2O_5$;

B. applying the glass composition directly to a metal member;

C. cooling the glass to a temperature of below about 600°C;

D. heating the glass and metal member up to a temperature of about 900°C at a rate of about 10°–80°C per hour, to form a glass-ceramic from the glass composition which intimately bonds directly to the metal member, said glass-




ceramic being a substantially homogeneous microcrystalline mass of ceramic having a Knoop handness value of over about 660 in a glass matrix;

E. maintaining the temperature of the glass-ceramic bonded metal member for about ½–10 hours;

F. cooling the glass-ceramic bonded metal member to room temperature.

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**3,977,858**

## APPARATUS FOR MEASURING A WIDTH OF A GLASS RIBBON IN PLATE GLASS MANUFACTURING

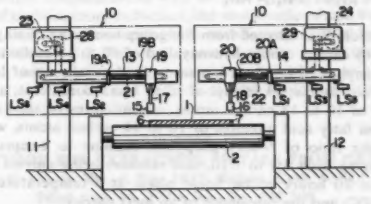
**Chiaki Taguchi, Hisai, Japan, assignor to Central Glass Co., Ltd., Ube, Japan**

**Filed Nov. 19, 1974, Ser. No. 525,171**

**Claims priority, application Japan, Nov. 20, 1973, 48-129680**

**Int. Cl.² C03B *17/00***

**U.S. Cl. 65—158** **2 Claims**



1. Apparatus for use in plate glass manufacturing, which generates an electrical signal representing a width of a glass ribbon while it is carried on a roller conveyor, comprising:

two detecting means being movable in a horizontal plane parallel to the major surfaces of said glass ribbon and in the direction perpendicular to that of the advancement thereof and adapted to detect side edges of said glass ribbon, said two detecting means initially situated at positions out of said side edges respectively to avoid undesirable affect of a high temperature atmosphere due to said glass ribbon and then moving toward a vertical plane involving a center line of said roller conveyor to detect said side edges respectively, said two detecting means each comprising an integral combination of a light-emitting element to emit a light beam therefrom and a photo-sensitive element, said photo-sensitive element receiving said light beam which is reflected by one of said side edges when the detecting means is brought above one of said side edges;

two moving means moving said two detecting means and stopping them when said two detecting means detect said

side edges, respectively, and said two moving means each including a supporting member movably supporting the corresponding detecting means, an electric motor, an endless chain rotatably connected to said electric motor to move the corresponding detecting means attached thereto: and

signal generating means generating an electrical signal indicative of distance between said two detecting means, so that said glass ribbon can be represented by said electrical signal when said two detecting means are forced to stop upon detecting said side edges, respectively, and then said two moving means moving said detecting means to their initial positions immediately after detecting distance between said two detecting means, and said signal generating means including at least two variable resistors, each resistance of which varies in proportion to the rotating distance of the corresponding endless chain.

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**3,977,859**

## ANTIMICROBIAL AND ALGICIDAL COMPOSITIONS CONTAINING REACTION PRODUCTS OF ε-CAPROLACTAM AND N-ALKYL-PROPYLENE-DIAMINES

**Hans-Werner Eckert, Dusseldorf, and Günter Koppensteiner, Hilden, both of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany**

**Division of Ser. No. 352,981, April 20, 1973, Pat. No. 3,892,806. This application Apr. 16, 1975, Ser. No. 568,695**
**Claims priority, application Germany, Apr. 24, 1972, 2220016**
**Int. Cl.² A01N *4/20***
**U.S. Cl. 71—67** **7 Claims**

1. An antimicrobial and algicidal composition active against gram-positive bacteria, gram-negative bacteria, fungi and algae consisting of from 0,1% to 10% by weight of a reaction product of ε-caprolactam with an N-alkyl-propylene-diamine of the formula

$$RHN - (CH_2)_3 - NH_2$$

wherein R is selected from the group consisting of alkyl of 10 to 18 carbon atoms, hydroxyalkyl of 10 to 18 carbon atoms, alkenyl of 10 to 18 carbon atoms, hydroxyalkenyl of 10 to 18 carbon atoms, alkadienyl of 10 to 18 carbon atoms, alkatrienyl of 10 to 18 carbon atoms, and mixtures of alkyl derived from fatty acid mixtures of 10 to 18 carbon atoms, with the molar ratio of N-alkyl-propylene-diamine to ε-caprolactam ranging from 1:1 to 1:10, said reaction being carried out for 3 to 20 hours in the liquid phase at a temperature above 180°C; and the remainder of an inert carrier.

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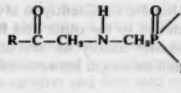
**3,977,860**

## HERBICIDAL COMPOSITIONS AND METHODS EMPLOYING ESTERS OF N-PHOSPHONOMETHYLGLYCINE

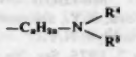
**John E. Franz, Crestwood, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 170,385, Aug. 9, 1971, Pat. No. 3,799,758, which is a continuation-in-part of Ser. No. 123,057, March 10, 1971, abandoned. This application June 11, 1973, Ser. No. 368,805**
**Int. Cl.² A01N *9/36***
**U.S. Cl. 71—86** **12 Claims**

1. A phytotoxic composition comprising an inert adjuvant and an effective amount of a compound of the formula



wherein R is —$OR^3$ wherein $R^3$ is selected from the group consisting of monovalent hydrocarbon groups, monovalent hydrocarbon-oxyhydrocarbon groups each containing from 1 to 18 carbon atoms, halogenated monovalent hydrocarbon groups, halogenated monovalent hydrocarbonoxyhydrocarbon groups each containing from 1 to 18 carbon atoms and from 1 to 3 halogens,



groups wherein $n$ is from 1 to 4 and $R^4$ and $R^5$ are independently selected from the group consisting of hydrogen, alkyl and hydroxyalkyl having 1 through 4 carbon atoms, alkenyl having 2 through 4 carbon atoms, $R^1$ and $R^2$ are each independently selected from the group consisting of —OH; —$OR^3$ wherein $R^3$ is as above defined and —$OR^6$ wherein $R^6$ is a salt-forming cation selected from the group consisting of cations of alkali metals, alkaline earth metals, copper, zinc, manganese, nickel, ammonium, organic ammonium, provided that when the organic group is aryl the ammonium salt is a primary amine salt, and mixtures of such salts, provided that no more than two of R, $R^1$ or $R^2$ can be —$OR^3$.

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**3,977,861**

## HERBICIDE COMPOSITION

**Yuji Kawamura, and Hiroshi Ono, both of Shiraoka, Japan, assignors to Nissan Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 2, 1974, Ser. No. 511,372**
**Claims priority, application Japan, Oct. 5, 1973, 48-11205**
**Int. Cl.² A01N *9/22, 9/14***
**U.S. Cl. 71—92** **2 Claims**

1. A synergistic herbicidal composition characterized by containing

a. 2-tertiary-butyl-4-(2,4-dichloro-5-isopropyloxyphenyl)-5-oxo-1,3,4-oxadiazoline and

b. 1,1,1-trifluoro-4′-(phenylsulfonyl) methanesulfono-O-toluidine as the active components, and in which the ratio of (a) to (b) is 1:0.5 to 1:8.

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**3,977,862**

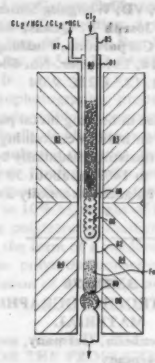
## PROCESS FOR SELECTIVELY CHLORINATING THE TITANIUM CONTENT OF TITANIFEROUS MATERIALS

**Hans Hellmut Glaeser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 398,470, Sept. 18, 1973, which is a continuation-in-part of Ser. No. 299,470, Oct. 20, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,422**
**Int. Cl.² C22B *1/08***
**U.S. Cl. 75—1 T** **22 Claims**

1. Process for chlorinating the titanium constituent of a titaniferous material without an appreciable net yield of iron chloride from the iron constituent of said titaniferous material determined on the basis of said titaniferous material prior to contact with a chlorinating agent, whereby said iron constituent is recoverable in the metallic state, by intimately contacting said material with a chlorinating agent at an elevated temperature of 950° to 1400°C. and in the presence of a carbonaceous reductant, said chlorinating agent comprising HCl and at least two other chlorine-containing members of the group consisting of $FeCl_3$, $FeCl_2$ and $Cl_2$, the ratio in the chlorinating agent of the atoms of chlorine provided by the total chlorine-containing members other than $FeCl_3$ to $FeCl_2$

being no more than about 4, the atomic ratio of carbon in said carbonaceous reductant to oxygen in said material being at least about 1, whereby said ratio is at least stoichiometric to produce carbon monoxide.



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**3,977,863**

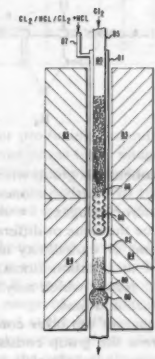
**PROCESS FOR SELECTIVELY CHLORINATING THE TITANIUM CONTENT OF TITANIFEROUS MATERIALS**

**Hans Hellmut Glaeser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 398,470, Sept. 18, 1973, which is a continuation-in-part of Ser. No. 299,470, Oct. 20, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,424**

**Int. Cl.² C22B *1/08***

**U.S. Cl. 75—1 T** **16 Claims**



**1. Process for chlorinating the titanium constituent of a titaniferous material without an appreciable net yield of iron chloride from the iron constituent of said titaniferous material determined on the basis of said titaniferous material prior to contact with a chlorinating agent, whereby said iron constituent is recoverable in the metallic state, by intimately contacting said material with a chlorinating agent at an elevated temperature of 950° to 1400°C. and in the presence of a carbonaceous reductant, said chlorinating agent comprising $FeCl_2$ and HCl, the amount of said chlorinating agent being sufficient to furnish at least 4 chlorine atoms per atom of titanium in the titaniferous material and the ratio in the chlorinating agent of the atoms of chlorine provided by the HCl to $FeCl_2$ being no more than about 4, the atomic ratio of carbon in said carbonaceous reductant to oxygen in said material being at least about 1, whereby said ratio is at least stoichiometric to produce carbon monoxide.**

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**3,977,864**

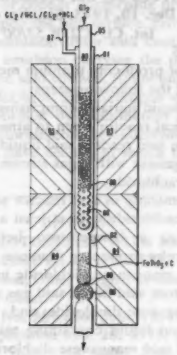
**PROCESS FOR SELECTIVELY CHLORINATING THE TITANIUM CONTENT OF TITANIFEROUS MATERIALS**

**Hans Hellmut Glaeser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 398,470, Sept. 18, 1973, which is a continuation-in-part of Ser. No. 299,470, Oct. 10, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,428**

**Int. Cl.² C22B *1/08***

**U.S. Cl. 75—1 T** **15 Claims**



**1. Process for chlorinating the titanium constituent of a titaniferous material without an appreciable net yield of iron chloride from the iron constituent of said titaniferous material determined on the basis of said titaniferous material prior to contact with a chlorinating agent, whereby said iron constituent is recoverable in the metallic state, by intimately contacting said material with a chlorinating agent comprising $FeCl_2$ at an elevated temperature of 950° to 1400°C. and in the presence of carbonaceous reductant, the molar ratio of said $FeCl_2$ to said titanium constituent of the titaniferous material being at least about 1.5:1, the atomic ratio of carbon in said carbonaceous reductant to oxygen in said material being at least about 1:1, whereby said ratio is at least stoichiometric to produce carbon monoxide.**

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**3,977,865**

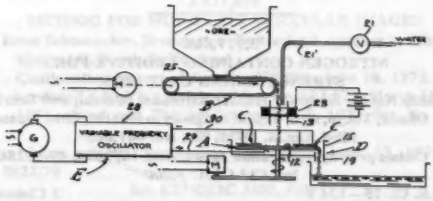
**METHOD FOR EXTRACTING METALS FROM ORE**

**Robert G. Owen, Rte. 4, Box 1810, Bishop, Calif. 93514**

**Filed Aug. 16, 1974, Ser. No. 498,209**

**Int. Cl.² C21C *5/52***

**U.S. Cl. 75—11** **13 Claims**




**1. A method for reducing metallic values from ore, which includes; preparation of the ore to substantially uniform granular form, then subjecting the prepared ore to the fusion of the metallic values therein by supporting the same in a layer upon a planar electrode and beneath a multiplicity of opposing electrode points, and by applying pulsating and opposite elec-**

trical potentials to the supporting electrode and opposing electrode points for the discharge of electrical energy through ever changing paths of least resistance caused by the resistive conductivity of the ore granules to heat and fuse the said metallic values into the melted state which subsequently solidifies into stable metal form smaller than the ore granules thereby shifting the resistive conductivity to other paths of least resistance, whereby random discharge of electrical energy is coextensive of said layer of ore with commensurate distribution of subjection to fusion.

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3,977,866

## METHOD FOR PRODUCING TITANIUM

Donald F. Othmer, 333 Jay St., Brooklyn, N.Y. 11201

Filed Dec. 10, 1973, Ser. No. 423,261
Int. Cl.[2] C22B *53/00*
U.S. Cl. 75—84.5 19 Claims

1. A process for producing titanium metal in a dense liquid form, comprising the following steps:

a. charging a liquid initially comprising molten manganese into a chemical reactor open to atmospheric pressure;
b. contacting in said reactor said liquid initially comprising molten manganese with a gas stream initially comprising titanium tetrachloride;
c. reacting chemically in said reactor at least a part of said titanium tetrachloride with at least a part of said molten manganese at a temperature between 1245°C and 1750°C, thereby producing titanium metal in said liquid, and gaseous manganese dichloride in said gas stream;
d. separating from said liquid said gas stream now containing said manganese dichloride; and
e. removing said liquid containing said titanium substantially free of said manganese dichloride.

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3,977,867

## GRAY IRON CASTING COMPOSITION WITH CONTROLLED IRON-CHROMIUM CARBIDE CONTENT

Steven C. Cochran, Peoria; Lawrence W. McFarland, and Baltasar R. Weiss, both of Pekin, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 402,277, Oct. 1, 1973, abandoned.
This application July 14, 1975, Ser. No. 595,935
Int. Cl.[2] C22C *37/06, 37/10*
U.S. Cl. 75—126 A 4 Claims

1. A gray iron casting consisting essentially of, in percentage by weight, 3.10 to 3.45 percent carbon, 1.60 to 1.70 percent silicon, 0.60 to 0.80 percent chromium, 0.40 to 0.90 percent manganese, and the balance iron with residual impurities including less than 0.40 percent molybdenum and other residual impurities individually limited to less than 0.20 percent; said gray iron casting having a closely controlled iron-chromium carbide content of from 20 to 40 percent in a preselected region thereof for improved resistance to wear, and with the remainder of said casting being more pearlitic and graphitic than said preselected region.

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3,977,868

## NITROGEN CONTAINING ADDITIVE FOR STRENGTHENING CAST IRON

Hideo Nakae, Kashiwa; Hitoshi Kiyosuke, Ibaraki, and Senri Okada, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 4, 1975, Ser. No. 601,663
Claims priority, application Japan, Aug. 16, 1974, 49-93286
Int. Cl.[2] C22C *30/00*
U.S. Cl. 75—134 F 3 Claims

1. A nitrogen containing additive for strengthening cast irons which consists essentially of 20 – 60% of silicon, 0.5 – 10% of calcium, 2.0 – 10% of nitrogen, 20 – 50% of at least one elements selected from the group consisting of chromium and manganese and the balance of iron and incidental impurity elements.

3,977,869

## INDIUM-CONTAINING, LOW SILVER COPPER-BASE FILLER METAL

Hans T. Steine, Crissier, VD; Wolfgang Simm, Lausanne, both of Switzerland, and Joseph F. Quaas, Island Park, N.Y., assignors to Eutectic Corporation, Flushing, N.Y.

Filed Aug. 14, 1975, Ser. No. 604,793
Int. Cl.[2] C22C *9/04*
U.S. Cl. 75—153 10 Claims

1. A filler metal for use in brazing metal parts together, said filler metal comprising an indium-containing, low silver, copper-base brazing alloy consisting essentially by weight of about 0.5 to 15% Ag, about 1 to 14% In, about 50 to 85% Cu, up to about 0.6% Si and the balance essentially Zn.

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3,977,870

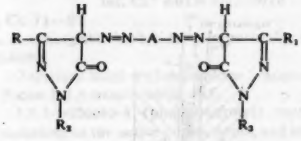
## DUAL LAYER ELECTROPHOTOGRAPHIC RECORDING MATERIAL

Jürgen Rochlitz, Breckenheim, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Continuation of Ser. No. 354,439, April 25, 1973, abandoned.
This application May 29, 1975, Ser. No. 581,999
Claims priority, application Germany, Sept. 21, 1972, 2246256
Int. Cl.[2] G03G *5/06*
U.S. Cl. 96—1.5 12 Claims

1. In an electrophotographic recording material comprising an electroconductive support material with a photoconductive double layer of organic materials composed of a tightly packed, homogeneous, uniform, opaque charge carrier producing dyestuff layer prepared by vacuum evaporation of the dyestuff and a transparent top layer of insulating materials containing at least one charge transporting compound,

the improvement in which the organic dyestuff layer consists of a compound of the general formula



wherein

A is a diphenyl or azobenzene group which may be substituted by alkyl with 1 to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms, and/or halogen,

R and $R_1$ which may be the same or different, are alkyl with 1 to 4 carbon atoms or carbalkoxy in which the alkyl groups have from 1 to 4 carbon atoms, and

$R_2$ and $R_3$ are phenyl groups which may be substituted by alkyl with 1 to 4 carbon atoms,

and in which said transparent top layer consists of a mixture of a binder selected from the group consisting of polyester, copolyester, silicone resin, styrene/maleic anhydride copolymer and polycarbonate resin with a charge transporting, monomeric, heterocyclic compound selected from the group consisting of oxazoles, oxdiazoles, triazoles, imidazoles and pyrazoles substituted by at least one dialkylamino group or two alkoxy groups and having an extended $\pi$-electron system, in which the dyestuff layer has a thickness of about 0.05 to about 2 microns and the transparent top layer has a thickness of about 5 to about 20 microns and in which the transparent top layer consists of about a 1 : 1 mixture by weight of the charge transporting heterocyclic compound and the binder, said recording material having a high mechanical resistance and good adhesion between the various layers and being useful in an electrophotographic copying process with negative charging of the top layer if an electron donating compound is used.

3,977,871

## ELECTROPHOTOGRAPHIC DEVELOPER WITH FIBERS OF POLYTETRAFLUOROETHYLENE

Walter Crooks, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 15, 1975, Ser. No. 604,988
Int. Cl.² G03G 13/08, 9/02
U.S. Cl. 96—15 D 4 Claims

1. In an electrophotographic process wherein an electrostatic image is made visible by contacting the surface bearing said image with finally divided toner particles of thermoplastic resin containing coloring material, the improvement according to which toner filming of the image bearing surface is reduced by incorporating in the toner in an amount from about 0.01% up to 10% by weight of the toner an additive of fine powder type polytetrafluoroethylene dispersed throughout said toner in the form of a random network of fibers, said fine powder type polytetrafluoroethylene having been obtained by coagulation of a colloidal acqueous dispersion.

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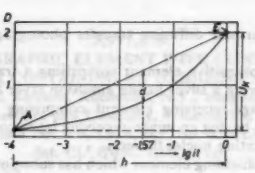
3,977,872

## PROCESS FOR THE PRODUCTION OF NEGATIVE CONTINUOUS-TONE IMAGES

Ehrhard Hellmig, Leverkusen, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany

Continuation of Ser. No. 369,605, June 13, 1973, abandoned, and a continuation of Ser. No. 133,529, April 13, 1971, abandoned. This application July 7, 1975, Ser. No. 593,688
Claims priority, application Germany, Apr. 18, 1970, 2018735
Int. Cl.² G03C 7/16, 5/04, 1/76
U.S. Cl. 96—17 7 Claims




1. A process for producing a standardized or prestandardized negative continuous-tone images or continuous-tone separation records on a photographic material having at least one light-sensitive silver halide emulsion layer from black and white or multi-colored originals of different contrasts comprising the steps of:

1. utilizing a photographic material having a characteristic curve having a substantially uniform progressive upward slope in a log It interval $h$ ranging at least over the greatest contrast range of all the originals and wherein the density situated at the half-way point of the interval $h$ of the characteristic curve of the silver halide emulsion layer is higher than the value at the start of the characteristic curve by 15 to 40% of the total contrast $U_K$ and that the curve has a maximum sag of at the most 50% of $U_K$ situated in the third or fourth fifth of the interval $h$,
2. determining the range of exposure for satisfactorily exposing the originals on the photographic material,
3. preselecting a series of contrast ranges for the originals,
4. correlating the series of contrast ranges with the ranges of exposures whereby the lower end of the series of contrast ranges is coordinated with the longest exposure and the upper end of the series of contrast is coordinated with the least acceptable exposure; and
5. exposing the originals on the photographic material in accordance with the correlated series of contrast ranges and ranges of exposures whereby the lower the contrast range of the original, the longer the exposure and the greater the contrast range of the original the shorter is the exposure.

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3,977,873

## METHOD FOR PHOTO-FABRICATION INSPECTION USING A SUBLAYER OF CUPRIC CHLORIDE UNDER PHOTOSENSITIVE LAYER

James S. Keil, St. Louis County, Mo., assignor to Kepro Circuit Systems Incorporated, St. Louis, Mo.

Filed Jan. 5, 1976, Ser. No. 646,599
Int. Cl.² G03C 5/00, 5/04
U.S. Cl. 96—27 R 10 Claims

1. In a method for rapidly inspecting a pattern to be photofabricationally provided on a surface from the class consisting of copper or alloys of copper comprising providing a coating of cupric chloride upon the said surface, providing a transparent photographic emulsion upon said coating, presenting a negative upon said emulsion carrying the pattern to be ultimately established on said surface, subjecting the assembly to a source of ultraviolet light, and thereupon visually inspecting the pattern to be formed by examination of color changes within the cupric chloride coating underlying the portions of the emulsion which have been light struck through the negative.

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3,977,874

## EPOXY RESIN PHOTORESIST WITH IODOFORM AND BISMUTH TRIPHENYL

Jerome Roteman, Solon, Ohio, assignor to American Can Company, Greenwich, Conn.

Division of Ser. No. 369,086, June 11, 1973, Pat. No. 3,895,954. This application Feb. 26, 1975, Ser. No. 553,264
Int. Cl.² G03C 5/00, 1/68; C08F 2/46; C01Y 1/19
U.S. Cl. 96—35.1 11 Claims

1. A process for polymerizing a monomeric or prepolymeric epoxide material or mixtures thereof, which comprises:

forming a mixture of a monomeric or prepolymeric epoxide material, or mixture thereof, polymerizable to higher molecular weights through the action of a cationic catalyst, with a radiation-sensitive catalyst precursor which decomposes upon exposure to electromagnetic or electron-beam radiation to provide an active catalyst effective to initiate polymerization of said epoxide material, said precursor being an organohalogen compound wherein the organo radicals are alkyl, aryl, alkaryl, aralkyl, alkoxy and aroxy in combination with an organometallic compound having the formula $R_5M$ wherein M is P, As, Sb or Bi and R is a hydrocarbyl radical or hydrogen with the proviso that at least one R is a hydrocarbyl radical;

and subsequently exposing the resulting mixture to electromagnetic or electron beam radiation to release an active catalyst in sufficient amounts to effect substantial polymerization of the epoxide material.

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3,977,875

## METHOD FOR MODIFYING VESICULAR IMAGES

Ernst Schumacher, Bremgarten, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Continuation-in-part of Ser. No. 370,896, June 18, 1973, abandoned, which is a division of Ser. No. 123,821, March 12, 1971, abandoned. This application Oct. 9, 1974, Ser. No. 513,450
Claims priority, application Switzerland, Mar. 13, 1970, 3822/70
Int. Cl.² G03C 5/00, 7/00
U.S. Cl. 96—48 R 7 Claims

1. A method for modifying a vesicular image present in a hydrophobic thermoplastic layer selected from the group consisting of polyvinylidene chloride, polymethacrylonitrile, polystyrene and polyepoxide polymers and co-polymers made from acrylonitrile with ethyl acrylate and co-polymers of

acrylonitrile with vinylidene chloride into a non-light-scattering image which method comprises

a. opening the closed bubbles of the vesicular image to form an open-pore image by allowing at least one organic lipophilic solvent which attacks the thermoplastic bubble walls of the vesicular image to act on the latter,

b. introducing the image substance selected from the group consisting of dyestuffs, optical brighteners and ultraviolet absorbers into the open pores by treatment with a solution in a hydrophilic solvent or with a dispersion of the image substance,

c. removing the excess adhereing image substance solution by briefly flushing with water, and

d. removing any remaining gas bubbles or closing the pores by a heat treatment or a treatment with a highly volatile organic solvent and drying the image material.

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**3,977,876**

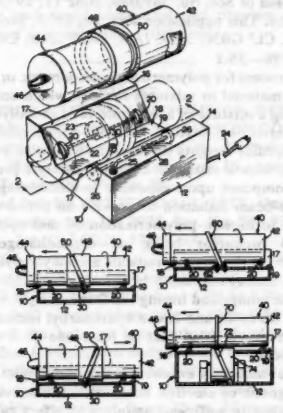
## METHOD OF PROCESSING PHOTOGRAPHIC MATERIAL

**Simon Ratowsky, Downsview, Canada, assignor to Monrick Holdings Limited, Downsview, Canada**

**Division of Ser. No. 427,798, Dec. 26, 1973, Pat. No. 3,905,584. This application Jan. 7, 1975, Ser. No. 539,255**

**Int. Cl.[2] G03C** *5/24; B01F 9/02, 11/00*

**U.S. Cl. 96—48 R** **1 Claim**



1. A method of processing photographic material of the sheet or roll type, comprising the steps of:

mounting the material arcuately within a tubular carrier;

horizontally disposing the carrier with respect to the longitudinal axis of the carrier;

introducing a predetermined quantity of processing liquid into the lower portion of the horizontally disposed carrier whereby the photographic material is contacted by the liquid on rotation of the carrier and closing the carrier;

rotating the carrier about its horizontal longitudinal axis and simultaneously oscillating the carrier in the direction of said axis in the form of a sine wave thereby causing the processing liquid in the carrier to move longitudinally along said axis and over said photographic material; and

after a predetermined time interval, removing the liquid from the carrier.

**3,977,877**

## FILM UNIT COMPRISING AN IMAGE RECEIVING ELEMENT AND LIGHT INTERCEPTING ELEMENT ATTACHED TOGETHER ALONG AT LEAST ONE EDGE THEREOF

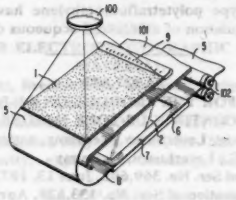
**Yasushi Oishi, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Aug. 19, 1974, Ser. No. 498,336**

**Claims priority, application Japan, Aug. 17, 1973, 48-92115**

**Int. Cl.[2] G03C** *1/48;* **G03D** *9/02*

**U.S. Cl. 96—76 C** **28 Claims**



1. A silver salt diffusion transfer photographic film unit comprising:

1. a photosensitive element comprising a transparent support having a silver halide emulsion layer thereon,

2. an image-receiving element comprising a transparent support having an image-receiving layer containing silver precipitating nuclei thereon,

3. a light-shielding element which has substantially the same area as the image-receiving element and which protects the silver halide emulsion layer of the photosensitive element from ambient light during the development of the film unit in a bright place,

4. a rupturable container retaining an alkaline processing solution and positioned to allow the alkaline processing solution to spread in the form of a layer into a clearance between the emulsion layer of the photosensitive element and the image-receiving layer of the image-receiving element,

5. a light-reflecting material in an amount sufficient to form a white background of a transferred silver image which is positioned between the image-receiving layer of the image-receiving element and the emulsion layer of the photosensitive element, said light-reflecting material being located in a layer coated on the image-receiving layer, in the alkaline processing solution, or in combinations of these locations, and

6. a silver halide developer;

wherein the image-receiving element and the light-shielding element are juxtaposed in such a manner that the image-receiving layer of the image-receiving element faces inside, and are fixed at at least one edge thereof to form a composite structure having an opening through which the photosensitive element after exposure can be introduced between the image-receiving element and the light-shielding element in such a manner that the emulsion layer of the photosensitive element faces the image-receiving layer of the image-receiving element; and means for placing said photosensitive element into said composite structure after exposure; said film unit further including a complex forming agent for dissolving silver halide.

3,977,878

## EPOXY RESIN PHOTORESIST WITH IODOFORM AND BISMUTH TRIPHENYL

Jerome Roteman, Solon, Ohio, assignor to American Can Company, Greenwich, Conn.

Division of Ser. No. 369,086, June 11, 1973, Pat. No. 3,895,954. This application Feb. 26, 1975, Ser. No. 553,262

Int. Cl.² G03C *1/94, 1/68*

U.S. Cl. 96—86 P 8 Claims

1. As an article of manufacture, a composite sheet, comprising:

A support; and in surface contact therewith, an organic-solvent-soluble layer responsive to electromagnetic or electron-beam radiation containing, in admixture, (a) a monomeric or prepolymeric epoxide or mixture thereof, said epoxide being polymerizable to higher molecular weights through the action of a cationic catalyst; and, (b) as a latent curing agent for polymerizing and insolubilizing said epoxide, a radiation-sensitive catalyst precursor which decomposes upon exposure to electromagnetic or electron-beam radiation to provide an active catalyst effective to initiate polymerization of said epoxide, said precursor being an organohalogen compound wherein the organo radicals are alkyl, aryl, alkaryl, aralkyl, alkoxy and aroxy in combination with an oranometallic compound having the formula $R_3M$ wherein M is P, As, Sb or Bi and R is a hydrocarbyl radical or hydrogen with the proviso that at least one R is a hydrocarbyl radical; said latent curing agent having had substantially no exposure to electromagnetic or electron-beam radiation.

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3,977,879

## PHOTOGRAPHIC ELEMENT WITH CONTIGUOUS LAYER CONTAINING AN OXIDIZING AGENT

John Howard Bigelow, Rochester, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 20, 1974, Ser. No. 535,137

Int. Cl.² G03C *1/06, 1/28*

U.S. Cl. 96—95 6 Claims

1. In a process wherein a photographic element comprising a radiation-sensitive, negative-type colloid-silver halide emulsion layer and a second layer which is contiguous to said emulsion layer is coated on a support and subsequently exposed to form a latent image which is developed in a formaldehyde-bisulfite-hydroquinone lithographic developer to produce an image in the exposed areas, the improvement comprising increasing the development speed and improving the halftone dot quality by incorporating in the aforesaid second layer an oxidizing agent selected from the group consisting of iodine and potassium iodate.

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3,977,880

## DIRECT-POSITIVE EMULSION CONTAINING SILVER HALIDE GRAINS INTERNALLY DOPED WITH METAL IONS, SURFACE RIPENED WITH GOLD AND SULFUR COMPOUND AND FOGGED BY LIGHT EXPOSURE

Mitsuo Saito, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

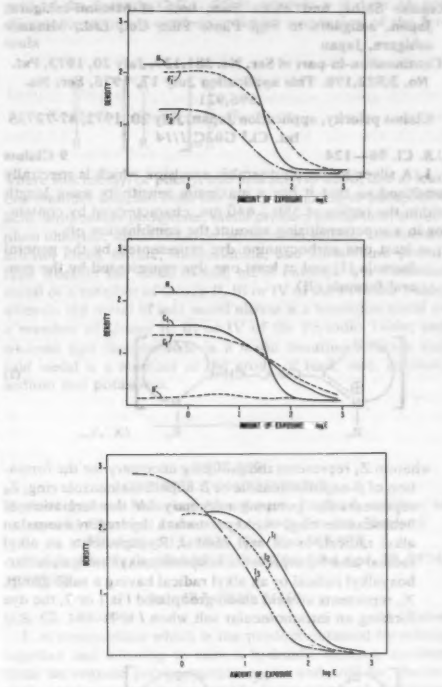
Filed Oct. 18, 1974, Ser. No. 515,958

Claims priority, application Japan, Oct. 18, 1973, 48-117289

Int. Cl.² G03C *1/28*

U.S. Cl. 96—108 13 Claims

1. A direct positive silver halide photo-sensitive emulsion comprising a hydrophilic colloid containing silver halide grains the interior of which contain an electron trapping polyvalent metal salt and the surface of which are ripened with



a compound containing a labile sulfur and a gold compound and then the surface of which is fogged by light exposure.

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3,977,881

## ACYLUREA COMPOUNDS

Rolf Kyburz, Thun, Switzerland, and Rainer Kitzing, Ilford, England, assignors to Ciba-Geigy AG, Basel, Switzerland

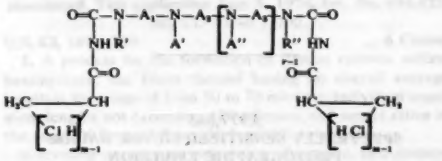
Filed Jan. 24, 1975, Ser. No. 543,752

Claims priority, application Switzerland, Jan. 31, 1974, 1332/74

Int. Cl.² G03C *1/30;* C07C *127/22*

U.S. Cl. 96—111 8 Claims

1. An acylurea compound which corresponds to the formula



wherein *m* is 1 or 2, *r* is 1 or 2, $A_1$, $A_2$ and $A_3$ denote alkylene radicals with at most 4 carbon atoms, A′ and A″ denote alkyl radicals with 1 to 2 carbon atoms and R′ and R″ denote hydrogen atoms or alkyl radicals, and the corresponding compounds in which at least one of the nitrogen atoms bonded to A′ and A″ is quaternary.

4. Process for crosslinking hydrophilic colloids which contain amino, imino and/or hydroxyl groups, which comprises using as a crosslinking agent a compound of the composition indicated in claim 1.

## 3,977,882
## SPECTRALLY SENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSION

**Keisuke Shiba, and Akira Sato, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Continuation-in-part of Ser. No. 381,137, July 20, 1973, Pat. No. 3,922,170. This application July 17, 1975, Ser. No. 596,921**

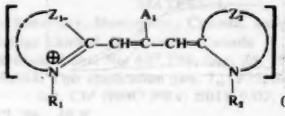
**Claims priority, application Japan, July 20, 1972, 47-72735**

**Int. Cl.² G03C 1/14**

**U.S. Cl. 96—124** **9 Claims**

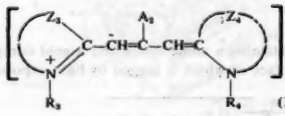
1. A silver halide photograhic emulsion which is spectrally sensitized so that it has a maximum sensitivity wave length within the region of 580 – 640 nm, characterized by containing in a supersensitizing amount the combination of:

at least one carbocyanine dye represented by the general formula (I) and at least one dye represented by the general formula (II)



(I)

wherein $Z_1$ represents the grouping necessary for the formation of β-naphthothiazole or β-naphthoselenazole ring, $Z_2$ represents the grouping necessary for the formation of benzoxazole ring, $A_1$ represents a hydrogen atom, an alkyl radical, or an aryl radical, $R_1$ represents an alkyl radical and $R_2$ represents a hydroxyalkyl radical, a carboxyalkyl radical or an alkyl radical having a sulfo group, $X_1$ represents an acid anion group, and $l$ is 1 or 2, the dye forming an intramolecular salt when $l$ is 1:



(II)

wherein $Z_3$ and $Z_4$ each represents the grouping necessary for the formation of a benzothiazole, benzoselenazole, β-naphthothiazole or β-naphthoselenazole ring, $A_2$ represents a hydrogen atom, an alkyl radical having less than three carbon atoms or an aryl radical, $R_3$ and $R_4$ each represents an alkyl radical, at least one of which represents a hydroxyalkyl radical, a carboxyalkyl radical or an alkyl radical having a sulfo group, $X_2$ represents an acid anion group, and $m$ is 1 or 2, the dye forming an intramolecular salt when $m$ is 1.

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## 3,977,883
## SPECTRALLY SENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSION

**Masanao Hinata; Haruo Takei; Akira Sato, and Atsuo Iwamoto, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

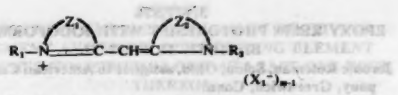
**Filed Dec. 6, 1974, Ser. No. 530,101**

**Claims priority, application Japan, Dec. 6, 1973, 48-138343**

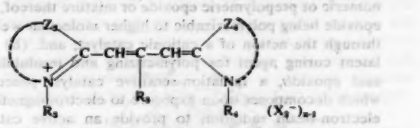
**Int. Cl.² G03C 1/14**

**U.S. Cl. 96—124** **7 Claims**

1. A silver halide photographic emulsion containing, in combination, supersensitizing amounts of at least one supersensitizing dye of the following general formula (I)



wherein $Z_1$ and $Z_2$ each represents an atomic group required to form a 2-quinoline ring; $R_1$ and $R_2$ each represents an aliphatic group, with at least one of $R_1$ and $R_2$ being a hydroxyalkyl group, an alkyl group containing a carboxyl group or an alkyl group containing a sulfo group; $X_1$ is an acid anion; and $m$ is 1 or 2 and when $m$ is 1 the dye forms an intramolecular salt and at least one sensitizing dye of the following general formula



wherein $Z_3$ represents an atomic group required to form a benzimidazole ring substituted in at least one of the 5- and 6-position with a chlorine atom or a benzoxazole ring unsubstituted at the 5-position or substituted at the 5-position with a methyl group, an ethyl group, a methoxy group, a phenyl group or a chlorine atom; $Z_4$ represents an atomic group required to form a benzothiazole or benzoselenazole ring unsubstituted at the 5-position or substituted at the 5-position with a chlorine atom or a methyl group, an ethyl group, a methoxy group or a phenyl group; $R_3$ and $R_4$ each represents an aliphatic group with at least one of $R_3$ and $R_4$ being an alkyl group containing a carboxyl group, a hydroxyalkyl group or an alkyl group containing a sulfo group; $R_5$ represents a hydrogen atom or an alkyl group; $X_2$ is an acid amine group; and $n$ is 1 or 2, and when $n$ is 1, the dye forms an intramolecular salt.

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## 3,977,884
## METAL PLATING SOLUTION

**Michael Gulla, Sherborn, and Charles A. Gaputis, Hyde Park, both of Mass., assignors to Shipley Company, Inc., Newton, Mass.**

**Filed Jan. 2, 1975, Ser. No. 538,125**

**Int. Cl.² C23C 3/02**

**U.S. Cl. 106—1** **21 Claims**

1. In an electroless plating bath containing a source of metal ions selected from the group consisting of copper, nickel, cobalt, gold and palladium, a complexing agent to maintain said ions in solution and a reducing agent for said metal ions, the improvement comprising elemental sulphur in said plating bath in an amount of at least 0.2 parts per million parts of the bath.

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## 3,977,885
## GLASS MANUFACTURING COMPOSITION

**Frank Bombola, Garden Grove, Calif., assignor to E/M Lubricants, Inc., West Lafayette, Ind.**

**Division of Ser. No. 361,343, May 17, 1973, Pat. No. 3,885,062. This application Feb. 14, 1975, Ser. No. 549,882**

**Int. Cl.² B28B 7/38**

**U.S. Cl. 106—38.27** **3 Claims**

1. A composition for use in treating molds employed in manufacture of glass parts consisting essentially of:

a mixture of about 1–25 parts by weight monoaluminum dihydrogen phosphate, $Al(H_2PO_4)_3$, and about 75:1 parts by weight of a member selected from a group consisting of graphite, carbon black, molybdenum disulfide, tungsten disulfide, molybdenum diselenide, molybdenum telluride, iron oxide, lead sulfide, and molybdenum, tungsten, chromium and carbides thereof, and mixtures thereof; and water.

3,977,886

## TRANSPARENT GLASS CERAMIC WITH SMALL THERMAL EXPANSION

Gerd Muller, Mainz-Weisenau, Germany, assignor to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Continuation of Ser. No. 267,266, June 29, 1972, abandoned. This application Oct. 3, 1974, Ser. No. 511,556

Claims priority, application Germany, July 1, 1971, 2132788

Int. Cl.² C03C 3/22, 3/04

U.S. Cl. 106—39.7 27 Claims

1. Transparent colorless glass ceramic with a linear thermal expansion coefficient less than $15 \times 10^{-7}$ /°C in the temperature range of about 20° to 300°C, containing irregularly oriented crystals of the structural type of $\beta$-quartz, consisting essentially of the following on an oxide basis:

| | | |
|---|---|---|
| $SiO_2$ | 45 to | 68% by weight |
| $Al_2O_3$ | 15 to | 30% by weight |
| $P_2O_5$ | 0 to | 10% by weight |
| $Li_2O$ | 2 to | 6% by weight |
| MgO | 0 to | 3% by weight |
| ZnO | 0 to | 8% by weight |
| $ZrO_2$ | 2 to | 7% by weight |
| $Ta_2O_5$ | 1 to | 7% by weight |

the contents of $Li_2O$, MgO, ZnO and $P_2O_5$ being such that the existing $Al_2O_3$ content, to within a residue or a deficit of $Al_2O_3$ of up to about 3% by weight, is sufficient for forming the formula units $LiAlO_2$, $MgAl_2O_4$, $ZnAl_2O_4$ and $AlPO_4$.

3,977,887

## HIGH DIELECTRIC CONSTANT CERAMICS WHICH CAN BE SINTERED AT LOW TEMPERATURES

Charles M. McIntosh, Beacon, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 8, 1974, Ser. No. 449,569

Int. Cl.² C04B 33/26, 35/00

U.S. Cl. 106—46 16 Claims

1. A high dielectric constant ceramic body which is nonporous by the Zyglo dye test and 0% porous by the water absorption test, which has been sintered at a temperature of from about 850°C to about 950°C to densify said body, which consists essentially of a major portion of a polycrystalline ceramic refractory material and a lead silicate based interstitial glass selected from the glasses from the binary system $PbO\text{-}SiO_2$, the ternary system $PbO\text{-}Al_2O_3\text{-}SiO_2$ and the ternary system $PbO\text{-}ZrO_2\text{-}SiO_2$ and which has a dielectric constant of from about 230 to about 550.

3,977,888

## INORGANIC COATING COMPOSITIONS WITH ALKALI SILICATE

Ryuichi Sano; Nobuhiro Kurano; Hiroshi Iwai, and Iwao Momiyama, all of Amagasaki, Japan, assignors to Kansai Paint Company, Ltd., Japan

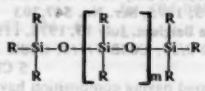
Continuation-in-part of Ser. No. 274,419, July 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 94,151, Dec. 1, 1970, abandoned. This application Nov. 15, 1974, Ser. No. 524,228

Claims priority, application Japan, Dec. 8, 1969, 44-98498

Int. Cl.² C09D 1/04

U.S. Cl. 106—74 7 Claims

1. A method for making an inorganic film-coated article comprising the steps of (a) coating a substrate with a viscous aqueous multicomponent suspension prepared by heating an aqueous suspension comprising 10–50 weight percent alkali silicate and 5–300 weight percent, based on the solids content of said alkali silicate solution, of amorphous silica powder of 0.5–50 micron particle size to above 50°C. with stirring, and (b) hardening the resulting coating by contact with an aqueous solution comprising a surface tension reducing agent selected from the group consisting of fluorcarbon sulfonic acid of the formula $C_nF_{2n+1}SO_3H$ wherein $n$ is 1 to 16 and silicone compounds or their colloidal suspension of the formula



where R is methyl or phenyl and $m$ is zero to 2230; and at least one member selected from the group consisting of phosphoric acid, ammonium phosphate, metal primary phosphate, ammonium chloride, metal chloride, ammonium sulfate, ammonium nitrate, metal nitrate, fluorosilicate, and ammonium persulfate, wherein the metal of said metal chloride is a transition metal or a member of Group II, III or IV of the Periodic Table; wherein the metal of said metal nitrate is a transition metal or a member of Group II, III or IV of the Periodic Table; and wherein said fluorosilicate is a metal hexafluorosilicate and said metal is a member of the group of lead, zinc, calcium, sodium and potassium.

3,977,889

## CEMENT COMPOSITIONS

Herbert Jackson Shearing, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 11, 1975, Ser. No. 567,074

Claims priority, application United Kingdom, Apr. 30, 1974, 18877/74

Int. Cl.² C04B 7/356

U.S. Cl. 106—96 11 Claims

1. A composition which is the product obtained by mixing together and allowing to cure a hydraulic cement, an inert filler, an organic polyisocyanate, water and coal tar, the organic polyisocyanate being used in an amount such that there is an excess of isocyanate groups over the isocyanate-reactive groups in the coal tar, and the weight of organic polyisocyanate and coal tar taken together being at least equal to the weight of water used.

3,977,890

## METHOD FOR THE PREPARATION OF FIBROUS CALCIUM SULFATE HEMIHYDRATE

Karlis L. Jaunarajs, Denver, Colo., and Julie C. Yang, Lexington, Mass., assignors to Johns-Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 281,267, Aug. 16, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,425

Int. Cl.² C04B 11/00

U.S. Cl. 106—109 6 Claims

1. A process for the formation of fibrous calcium sulfate hemihydrate, the fibers thereof having an overall average length in the range of from 30 to 70 microns, individual maximum lengths not exceeding 180 microns, and aspect ratios in the range of from 10:1 to 100:1; which comprises:

a. forming an aqueous suspension of gypsum, said suspension being not greater than 0.30 molar in gypsum, and said gypsum prior to dispersion being in the form of particles at least 90% of which are at least minus 4 mesh in size; and

(b) converting the gypsum in said suspension to said fibrous hemihydrate by reaction in a pressure vessel in the presence of saturated steam at a temperature in the range of from 125° to 140°C for a period of 0.5 to 2.5 hours, thereby forming fibers of calcium sulfate hemihydrate having the aforesaid dimensions.

3,977,891

## ROAD-SURFACING COMPOSITIONS CONTAINING FILLER MATERIALS

**Olivier Bertrand, Gaurain Ramecroix, Belgium, assignor to Societe Generale des Ciments Portland de l'Escaut, Antoing, Belgium**

**Continuation of Ser. No. 375,854, July 2, 1973, abandoned. This application Feb. 5, 1975, Ser. No. 547,203**

**Claims priority, application Belgium, July 13, 1972, 119859**

**Int. Cl.² C08L 95/00; C09D 3/24; C04B 31/18; C08K 7/00**

**U.S. Cl. 106—281 R** **5 Claims**

1. A filler material for a road paving composition having a low sensitivity to water and having fine gravel, pebbles and an organic binder selected from the group consisting of asphalt, bitumen and tar, said filler material comprising at least one natural hydrated silicate selected from the group consisting of kaolinite, antigorite, sepiolite and palygorskite, said hydrated silicate having been subjected to a heat treatment at a temperature between 200°C and 800°C to irreversibly remove water of hydration to enhance porosity and ability to absorb bitumen, said filler material having a fineness at which at least 80% by weight will pass through a 74 micron screen, a porosity of at least 55% by volume and a swelling factor of not more than 3% in water after said organic binder has been absorbed therein.

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3,977,892

## AGGLOMERATION OF FINELY DIVIDED PARTICLES

**Edward Y. Crossmore, Jr., Shippenville, Pa., assignor to Clyde L. Miller, Indiana, Pa. and William C. Leasure, Houston, Tex., part interest to each**

**Filed Sept. 24, 1973, Ser. No. 400,002**

**Int. Cl.² C09C 1/28**

**U.S. Cl. 106—288 B** **20 Claims**

1. A method of agglomerating finely-divided particles selected from carbonaceous combustible materials, siliceous materials and crystalline inorganic materials which comprises preheating said particles to an elevated temperature of about 150° to 170°C, preheating a binder solution comprising a saturated, dendritic crystal-forming aqueous sodium chloride solution to an elevated temperature below the temperature of said preheated particles, mixing thoroughly said preheated particles and said preheated binder solution in a ratio of about 10 to 20 grams of particles per milliliter of binder solution, shaping the resulting mixture under pressure and cooling the shaped mixture to recrystallize said binder solution and provide said agglomerate.

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3,977,893

## AMORPHOUS PRECIPITATED SILICEOUS PIGMENTS AND IMPROVED PROCESS FOR PRODUCING SUCH PIGMENTS

**Satish K. Wason, Havre de Grace, Md., assignor to J. M. Huber Corporation, Locust, N.J.**

**Continuation of Ser. No. 403,129, Oct. 3, 1973, abandoned. This application Aug. 20, 1975, Ser. No. 606,036**

**The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.**

**Int. Cl.² C09C 1/30**

**U.S. Cl. 106—288 B** **5 Claims**

1. A method for producing amorphous, precipitated silicic acid pigments having improved chemical and physical properties when employed in dentifrice compositions, said method comprising the steps of: providing an aqueous reaction medium containing an electrolyte, adjusting the pH of the aqueous medium to a value in the range of from about 8.0 to 10.4; simultaneously introducing an acid and a prepolymerized alkali metal silicate into said aqueous reaction medium; said acid being selected from the group consisting of sulfuric acid, nitric acid and hydrochloric acid; said prepolymerized alkali metal silicate being selected from the group consisting of sodium silicate, potassium silicate and lithium silicate, said alkali metal silicate being at least partially polymerized and having an $SiO_2/X_2O$ ratio of about 2.0 to 3.3, wherein X is selected from the group consisting of sodium, potassium and lithium, and said electrolyte comprises the sodium, potassium or lithium salt of said acid; continuing the addition of the said acid and said silicate to said aqueous reaction medium in a manner such that a substantially constant pH in the range of from about 8.0 to 10.4 is maintained and until the precipitation of said pigment is substantially complete and recovering the precipitated pigment from the aqueous reaction medium.

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3,977,894

## RHEOLOGICAL AGENT FOR NON-AQUEOUS FLUID SYSTEMS

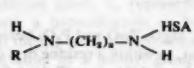
**Robert Winslow White, Califon, and Armando Franco, Monmouth Junction, both of N.J., assignors to NL Industries, Inc., New York, N.Y.**

**Filed Sept. 19, 1975, Ser. No. 615,105**

**Int. Cl.² C09C 1/42**

**U.S. Cl. 106—288 Q** **7 Claims**

1. A self-activating organoclay rheological composition, useful as an additive for non-aqueous fluid systems, comprising a mixture of an organically modified montmorillonite clay and two solid waxes, said clay modified with a quaternary ammonium compound and said two waxes being (1) glyceryl tri-12-hydroxystearate and (2) an amide wax having the formula



where *n* is from 2 to 18, HSA is the acyl radical of 12-hydroxystearic acid, R is selected from the group consisting of hydrogen or the acyl radical of 12-hydroxystearic acid.

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3,977,895

## METHOD OF REDUCING THE AMOUNT OF CADMIUM CAPABLE OF BEING EXTRACTED FROM CALCINED CADMIUM PIGMENT POWDER BY HUMAN GASTRIC JUICES

**Rolf Berger, Ludwigsburg; Wolfgang Kuch, Asperg, and Hartmut Endriss, Stuttgart-Kraherwald, all of Germany, assignors to BASF Farben & Fasern Aktiengesellschaft, Hamburg, Germany**

**Filed Nov. 26, 1975, Ser. No. 635,720**

**Claims priority, application Germany, Dec. 5, 1974, 2457390; Mar. 29, 1975, 2513964**

**Int. Cl.² C09C 1/10**

**U.S. Cl. 106—301** **9 Claims**

1. A method of reducing the amount of cadmium capable of being extracted form a calcined, cadmium-bearing pigment powder by dilute acids which comprises:

a. suspending said powder in an aqueous medium;

b. dissolving in said medium a water-soluble tin salt and an amount of sulfide ions not greater than stoichiometrically equivalent to the tin content of said tin salt at a pH not higher than 8.5; and

c. recovering the solids from the mixture so obtained as a modified pulverulent pigment.

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3,977,896

## PROCESS FOR DEPOSITING PYROLYTIC CARBON COATINGS

**Jack C. Bokros, and Robert J. Akins, Sr., both of San Diego, Calif., assignors to General Atomic Company, San Diego, Calif.**

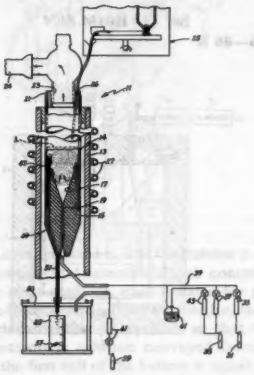
**Filed Mar. 9, 1972, Ser. No. 233,246**

**Int. Cl. C01b 31/04**

**U.S. Cl. 427—213** **10 Claims**

1. In a process for depositing pyrolytic carbon coatings, which process includes disposing particles less than a millimeter in size and having an initial density of at least about 3

gm/cm³ in a fluidized bed coating enclosure, flowing an atmosphere containing a carbonaceous substance through the enclosure while heating the particles to a temperature sufficient to cause thermal decomposition of said substance and deposition of pyrolytic carbon coatings, the improvement which comprises removing from the coating enclosure controlled numbers of particles which have grown in size as a result of said carbon deposition, said removal being carried out by gravity flow through withdrawal conduit means from



the upper one-third of said fluidized bed and without disrupting said flow of said atmosphere through said enclosure, the rate at which said particles are removed from said enclosure being controlled by regulating the rate of flow of an inert gas stream which flows upward through the conduit means to create resistance to said gravity removal of said particles, and adding to the coating enclosure particles of smaller size in an amount proportional to said removed particles to maintain the total deposition surface area within the coating enclosure relatively constant.

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3,977,897

## PROCESS FOR PREPARING A NON-CHEMICALLY INHIBITED STARCH

Otto B. Wurzburg, Whitehouse Station, and Leo H. Kruger, Kendall Park, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Sept. 8, 1975, Ser. No. 611,136

Int. Cl.² C13L *1/08*

U.S. Cl. 127—71 9 Claims

1. A process for preparing a non-chemically inhibited starch comprising the steps of

a. preparing a suspension comprising

i. 100 parts of amylose-containing starch in intact granule form,

ii. 10–60 parts of an inorganic salt effective in raising the gelatinization temperature of said starch; and

iii. sufficient water to suspend said starch;

b. maintaining the pH of said suspension at a level of 3 to 9; and

c. heating said dispersion at a temperature of 50°–100°C. for a period of 0.5 to 30 hours, wherein said inorganic salt is selected from the group consisting of sodium sulfate, ammonium sulfate, magnesium sulfate, potassium sulfate, sodium chloride, potassium chloride, sodium phosphate, potassium phosphate, ammonium chloride and ammonium phosphate.

3,977,898

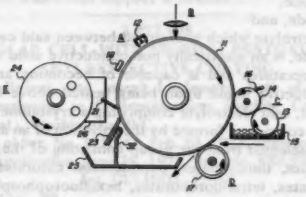
## METHOD FOR CLEANING A SUPPORT SURFACE

Stephen C. P. Hwa, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 482,726, June 24, 1974, Pat. No. 3,918,809. This application July 23, 1975, Ser. No. 598,445

Int. Cl.² B08B *1/02*

U.S. Cl. 134—6 4 Claims



1. A method of cleaning liquid developer and debris from the uphill portion of a moving support surface in an electrostatographic apparatus comprising contacting the moving support surface having liquid developer thereon with a wiper blade and thereafter contacting the uphill portion of the support surface with at least one scraper blade downstream of the wiper blade to remove residual liquid developer and solid debris from said support surface, the scraper being a blade having a stem extending towards the tip of the blade in contact with the surface in the upstream direction of motion of the surface and the wiper being a blade having a stem extending towards the tip in contact with the surface in the downstream direction and pressed against the surface so that it is bent along its length in the downstream direction.

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3,977,899

## SOLID ELECTROLYTE CELL

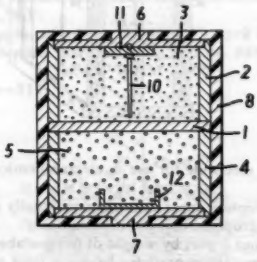
Kazutoshi Takeda, Sendai, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Dec. 9, 1974, Ser. No. 530,861

Claims priority, application Japan, Dec. 12, 1973, 48-139026

Int. Cl.² H01M *4/36*

U.S. Cl. 136—83 R 6 Claims




1. An electrochemical cell comprising a pellet of positive-active material, negative-active material of amalgamated alkali metal or its alloy and a solid electrolyte of $\beta$ alumina interposed therebetween, wherein said positive active materials comprises cupric sulfate penta hydrate, cupric sulfate trihydrate and said pellet has conductive current collector material consisting of graphite and a conductive metal which is inert wth respect to said positive active material disposed therein.

## 3,977,900
## THERMALLY ACTIVATED ELECTROCHEMICAL CELL INCLUDING AN ALKALI METAL SALT SOLVATE ELECTROLYTE

Dean C. Luehrs, Dollar Bay, Mich., assignor to Board of Control, Michigan Technological University, Houghton, Mich.

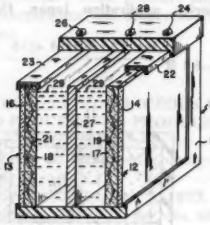
Filed June 5, 1975, Ser. No. 583,897
Int. Cl.² H01M 6/04
U.S. Cl. 136—83 T 6 Claims

1. A thermally activated electrochemical cell including
a cathode,
an anode, and
an electrolyte which is disposed between said cathode and anode, is an electrically non-conductive solid at ambient temperatures and is capable of becoming an ionically conductive liquid upon being heated above its melting point, said electrolyte comprising a crystalline coordination compound formed by the solvation of an alkali metal salt selected from the group consisting of the bromides, iodides, thiocyanates, perchlorates, chlorates, nitrates, acetates, tetrafluoroborates, hexafluorophosphates, and hexafluoroantimonates of lithium and sodium, lithium chloride, potassium iodide, and potassium thiocyanate with a polar organic solvent selected from the group consisting of hexamethylphosphoramide, formamide, N-methylformamide, dimethylformamide, N-ethylformamide, diethylformamide, tetramethylurea, trimethylphosphate, triethylphosphate, tripropylphosphate, tributylphosphate, acetamide, dimethylacetamide, diethylacetamide, acetonitrile, acetone, pyridine, dimethylsulfoxide, diethylsulfoxide, dipropylsulfoxide, ethylene glycol, propylene carbonate, and lower alkyl alcohols containing 1 to 4 carbon atoms.

## 3,977,901
## METAL/AIR CELLS AND IMPROVED AIR ELECTRODES FOR USE THEREIN

Edward S. Buzzelli, Export, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 23, 1974, Ser. No. 517,115
Int. Cl.² H01M 4/00
U.S. Cl. 136—86 A 15 Claims

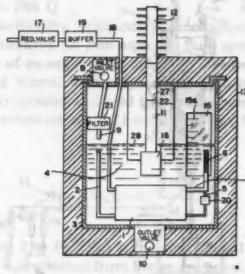



1. An air electrode for use in electrochemical energy cells comprising:
A. a hydrophilic layer consisting essentially of
1. a hydrophilic composite comprising
i. about 1 part by weight of oxygen absorption/reduction carbon particles having a total surface area of from about 30 to about 600 sq. meters/gram;
ii. about 0.5–4 parts by weight of a low oxygen overvoltage material selected from the group consisting of $CuWO_4$, $NiWO_4$ $CoWO_4$, $WS_2$, WC and WC fuse sinter coated with 1–20 wt.% Co and mixtures thereof;
iii. an effective amount of a bonding/nonwetting agent including at least polytetrafluoroethylene; and
iv. an effective amount of a catalyst for oxygen reduction and decomposition of perhydroxides selected from the group consisting of silver, platinum and silver mercury alloy; and
2. a metal current collector molded into said composite to form a hydrophilic layer; and
B. a hydrophobic layer laminated to said hydrophilic layer.

## 3,977,902
## FUEL CELL SYSTEM

Hans Sauer, Glashutten, Taunus, and Dieter Spahrbier, Frankfurt-Rodelheim, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed Apr. 26, 1974, Ser. No. 464,510
Claims priority, application Germany, Apr. 26, 1973, 2321087
Int. Cl.² H01M 8/04
U.S. Cl. 136—86 R 15 Claims




1. In a fuel cell system comprising a plurality of fuel cells responsive to the presence of liquid electrolyte and operating gas to produce electrical energy, the improvement which comprises:
a tank adapted to be at least partly filled with said electrolyte;
a container enclosing said fuel cells and positioned within said tank so as to be at least partly immersed in the electrolyte;
electrolyte inlet means to the fuel cells within the container, said inlet means leading from the tank into the container and having its intake submerged below the level of the liquid electrolyte;
electrolyte outlet means from the fuel cells within the container, said outlet means leading from the container into the tank;
means for supplying operating gas from outside the tank to the fuel cells in the container;
gas outlet means from the container for the residue of the said gas supplied to the fuel cells; and
means supplied with the said gas residue from the gas outlet means for utilizing the residue to produce flow of the liquid electrolyte through the electrolyte inlet means into the fuel cells within the container and through the electrolyte outlet means from the fuel cells back into the tank.

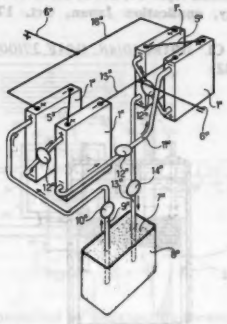
## 3,977,903
## FORCED-FLOW ELECTROCHEMICAL BATTERY

Jean Jacquelin, Marolles en Hurepoix, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France

Filed Dec. 6, 1974, Ser. No. 530,098
Claims priority, application France, Dec. 6, 1973, 73.43591
Int. Cl.² H01M 8/04, 8/24
U.S. Cl. 136—86 A 5 Claims

1. In an electrochemical battery of the type comprising a plurality of cells fed in a series by an electrolytic solution comprising, an active material including zinc powder, in suspension, a storage tank, said solution being conveyed by forced flow in said cells from said storage tank to a first cell

of said plurality of cells and made to flow back into said tank after having passed through a last cell of said plurality of cells, cells being grouped together in modules and electrically connected in series within said modules, said modules themselves being fed in series by the solution, the battery being capable of producing an electromotive force mU and a rated current I, said modules themselves being grouped into $p$ assemblies and electrically connected in series in each assembly, the



improvement characterized in that the number $p$ of assemblies is an even number, said assemblies each comprising the the same number $m$ of modules, each suitable for producing an electromotive force U and a rated current $I/p$, said assemblies being connected together in parallel, so that the potential across the electrolytic solution conveyed from the storage tank towards the first cell of the battery is equal to the potential across the solution leaving the last cell of said battery before being made to flow back into said storage tank.

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**3,977,904**

## SEMI-CONDUCTOR BATTERY

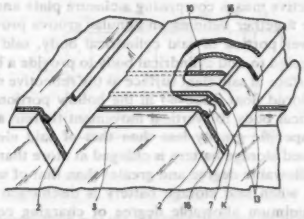
**Franz Köhler, Unterhaching, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany**

**Filed Mar. 17, 1975, Ser. No. 558,859**

**Claims priority, application Germany, Mar. 29, 1974, 2415187**

**Int. Cl.² H01L 31/04**

**U.S. Cl. 136—89** **10 Claims**



**1. In a semi-conductor battery of the type including a plurality of laminar semi-conductor bodies arranged on a dielectric support in parallel relation to each other and each comprising two layers of respectively oppositely conducting semi-conductor materials forming a photovoltaic junction, with the layer adjacent the support being of the same conducting type in all the semi-conductor bodies, and contact strips electrically interconnecting oppositely conducting layers of adjacent semi-conductor bodies and extending throughout the length of the adjacent semi-conductor bodies, the improvement comprising, in combination, said support having one surface formed with a plurality of notches extending parallel to each other and separated by lands, said semi-conductor bodies being applied directly to said lands; said contact strips extending in said notches between two adjacent lands and being, along the edge of one land of the two adjacent lands, in electrical contact with that layer, of the respective semi-conductor body on said one land, which is directly adjacent said support and, along the edge of the other land of the respective two adjacent lands, in electrical contact with that layer, of the respective semi-conductor body on said other land, which is remote from said support.**

**2. In a semi-conductor battery, the improvement claimed in claim 1, in which said support is flexible.**

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**3,977,905**

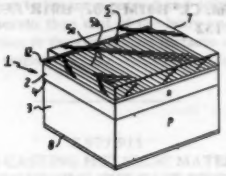
## SOLAR CELL WITH NIOBIUM PENTOXIDE ANTI-REFLECTIVE COATING

**Akos G. Revesz, and Joseph Lindmayer, both of Bethesda, Md., assignors to Communications Satellite Corporation (Comsat), Washington, D.C.**

**Division of Ser. No. 331,741, Feb. 13, 1973, abandoned. This application June 20, 1975, Ser. No. 588,935**

**Int. Cl.² H01L 31/04**

**U.S. Cl. 136—89** **2 Claims**



**1. A solar cell responsive to light, including light in the short wavelength region of the light spectrum between 0.3 and 0.5 microns, and having an anti-reflective coating over the primary surface of the solar cell through which light enters, which coating does not absorb or reflect useful light including short wavelength light, the improvement comprising an anti-reflective coating consisting of niobium pentoxide.**

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**3,977,906**

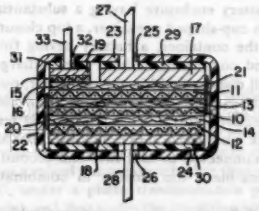
## FLAT ALKALINE CELL WITH POSITIVE AND NEGATIVE TERMINAL CONNECTIONS AND A THIRD TERMINAL CONNECTION FOR AN AUXILIARY ELECTRODE

**Theodore R. Beatty, Bay Village, and Harry Vourlis, Lakewood, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 456,837, April 1, 1974. This application Mar. 17, 1975, Ser. No. 559,074**

**Int. Cl.² H01M 21/00**

**U.S. Cl. 136—111** **20 Claims**



**1. A flat alkaline cell comprising an electrode assembly including at least a pair of flat electrode elements of opposite polarity and a porous separator containing an alkaline electrolyte interposed between and in contact with the pair of electrode elements, said electrode assembly being enclosed within**

a sealed, liquid impervious plastic film envelope having a first, second and third terminal connection, said first terminal connection comprising a current collector disposed adjacent to one end of said electrode assembly in electrical connection with one of said pair of electrode elements and having at least a portion thereof exposed through an opening in one wall of said envelope for making external electrical connection, and a layer of adhesive sealant which is non-wettable by the alkaline electrolyte, tightly adhering and sealing together said current collector and said wall of said plastic film envelope around at least the periphery of said opening, said second and third terminal connections being in electrical connection respectively with the other of said pair of electrode elements and an auxiliary electrode inside said cell.

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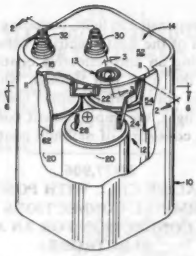
**3,977,907**

## RECHARGEABLE BATTERY ENCLOSURE

**Gary L. Roth, Littleton, and Merrill H. McGlamery, Florence, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.**

**Filed Nov. 28, 1975, Ser. No. 636,259**
**Int. Cl.² H01M** *2/02;* **H01R** *13/50*
**U.S. Cl. 136—132** **12 Claims**



**1.** In a battery enclosure having a substantially polygonal cross-section cup-shaped container, a top closure bridging the opening of the container, a battery having first and second terminals and comprising at least one rechargeable electrochemical cell disposed within the container, output terminals mounted exteriorly on the top closure and electrically connected respectively to said first and second terminals, and a recharge jack mounted in said top closure and having contacts electrically connected to said first and second terminals, an improved one-piece top closure in combination therewith comprising:

a substantially planar top surface on which is integrally mounted said recharge jack and output terminals, and having ledge portions adapted to fixedly mount to said container; and

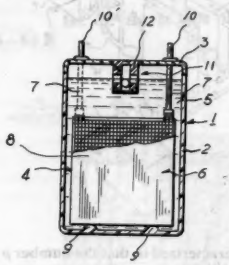
a spacer integral with and extending substantially perpendicularly of said top surface and disposed inside said container bearing against the battery thereby substantially immobilizing the battery.

**3,977,908**

## INDICATOR IN USE WITH A LEAD STORAGE BATTERY FOR INDICATING THE OVERDISCHARGE OF THE SAME AND THE LOWERED LEVEL OF THE ELECTROLYTE THEREIN

**Yasuo Kitai, Kumagaya, Japan, assignor to Shin-Kobe Electric Machinery Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 376,711, July 5, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,490**
**Claims priority, application Japan, Oct. 17, 1972, 47-119792[U]**
**Int. Cl.² H01M** *10/48;* **G01F** *23/00*
**U.S. Cl. 136—182** **2 Claims**



**1.** An indicator in use with a lead storage battery comprising a case and battery elements disposed in said case, said battery elements including electrolyte and a set of plates, said indicator adapted to indicate the over-discharged state of said storage battery and also the lowered level of said electrolyte below minimum allowable level, said indicator comprising a single cylindrical hollow body of transparent material with the upper end of said body exposed at the top of said case and with the lower end of said body dipped in said electrolyte, said lower end of said body having an opening to receive said electrolyte in said hollow body therethrough and positioned substantially at said minimum allowable level of said electrolyte, reflective means disposed adjacent to the lower end of said cylindrical body in a manner in which said reflective means is sealed in said body so as not to contact said electrolyte to always reflect light from the upper face of said cylindrical body therethrough in a vertical direction and then in an inwardly diametrical direction,

said reflective means comprising a closure plate and a slant surface together defining an annular groove provided in the lower portion of said cylindrical body, said closure plate sealed to said cylindrical body to provide a body-to-air interface at said slant surface as the reflective means,

and a colored float disposed in the hollow portion of said cylindrical body for vertical movement therein and having a specific gravity less than that of said electrolyte when said storage battery is charged at more than a minimum allowable degree and greater than that of said electrolyte when said storage battery is discharged beyond said minimum allowable degree of charging condition, said colored float cooperating with said reflective means to provide a colored annulus at the top of said cylindrical body for indicating one of said over-discharged state and said lowered level of said electrolyte.

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**3,977,909**

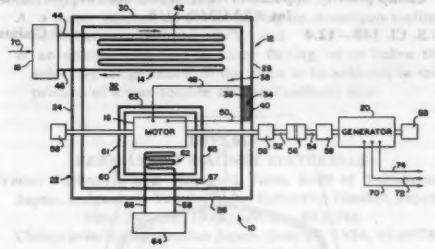
## SOLAR HEAT ENERGY CONVERSION SYSTEM

**Otto A. Cremonese, 3010 Perry Ave., Tampa, Fla. 32304**

**Filed Mar. 18, 1974, Ser. No. 451,797**
**Int. Cl.² H01L** *35/00*
**U.S. Cl. 136—206** **8 Claims**

**1.** A solar energy conversion system for converting thermal energy to electrical energy, said conversion system comprising a first finite heat sink defining an enclosure including walls having an interior chamber formed thereby, a first heat exchange means disposed within said first finite heat sink, said first heat exchange means coupled to a first cryogenic liquid

gas source to cool said interior chamber, direct current motor disposed within said interior chamber, said walls of said first finite heat sink including a thermopile formed therein, said walls comprise a vacuum to maintain said interior chamber at a cryogenic temperature, said direct current motor coupled to said thermopile to receive electric energy therefrom, and an electric generator means disposed externally of said interior chamber, said electric generator means and said direct current




motor interconnected by internecting means, said direct current motor electrically coupled to said thermopile and mechanically coupled to said electrical generator means disposed externally of said first finite heat sink such that electrical energy derived from said thermopile power said direct current motor and said direct current motor converts the electricity to mechanical energy to drive said electric generator means to generate electric energy.

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**3,977,910**

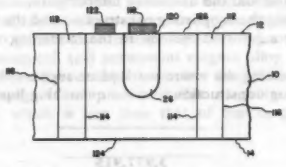
## DEEP FINGER DIODES

**Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 411,002, Dec. 14, 1973, abandoned. This application Jan. 30, 1975, Ser. No. 545,531**

**Int. Cl.² H01L 7/34**

**U.S. Cl. 148—1.5** **25 Claims**



1. A process for making a semiconductor device comprising the process steps of:

a. selecting a body of semiconductor material having a predetermined leverl of resistivity, a predetermined type conductivity and two major opposed surfaces which are, respectively, the top and bottom surfaces thereof, at least one of the major surfaces having a preferred planar crystal structure orientation, and a vertical axis of the body being substantially aligned parallel with a first axis of the crystal structure which is substantially perpendicular to at least the major surface having the preferred planar orientation;

b. selectively etching a selective portion of the at least one major surface having a preferred crystal planar orientation to form depressions therein having a preferred geometric configuration;

c. vapor depositing a layer of metal of a preferred thickness in each depression;

d. forming a melt of the metal and a portion of the semiconductor material of the body in contact therewith on the major surface of the body;

e. establishing a first thermal gradient substantially parallel with the vertical axis and the first crystal axis of the body;

f. migrating each melt into the body a predetermined distance in the direction of the higher temperature of the thermal gradient from the one major surface less than the distance between the two major opposed surfaces to form a first region of recrystallized semiconductor material of the body having solid solubility of the selective metal therein;

g. establishing a second thermal gradient substantially parallel with the vertical axis and the first crystal axis of the body, and

h. migrating each melt from that point within the body wherein the melt had migrated to that major opposed surface from which the melt had initially been migrated therefrom to form a second region of recrystallized material of the the first region and having solid solubility of the deposited metal therein of a predetermined concentration sufficient to impart a second and opposite type conductivity thereto than that of the body and also forming a P-N junction at the contiguous surfaces of the material comprising respectively the second region and the body.

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**3,977,911**

## METHOD FOR CASTING METALLIC MATERIAL WHILE TOUGHENING THE CAST PIECE

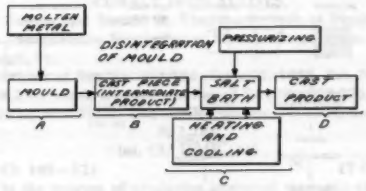
**Seiji Takase, Yokohama, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 24, 1975, Ser. No. 571,401**

**Claims priority, application Japan, May 29, 1974, 49-60624**

**Int. Cl.² C21D 5/00**

**U.S. Cl. 148—3** **1 Claim**




1. A method for casting metallic material while toughening the cast piece, characterized in that after the metallic material poured into a mould has been solidified, the mould is disintegrated during the period when the temperature of said metallic material is at a raised temperature higher than the temperature of 100°C, under a phase transformation point of said metallic material, and that under the condition where the thus obtained intermediate product is loaded with a low stress of the order of 1/10 – 1/20 of the yielding point stress of said metallic material, super-plastic phenomena are generated by applying temperature cycles passing over said phase transformation point and thereby said intermediate product is subjected to toughening treatment.

3,977,912

## PROCESS FOR REDUCING THE RATE OF SLUDGE FORMATION IN CRYSTALLINE PHOSPHATIZING BATHS

Dora Smadja, Paris; Marie-Therese Decker, Gennevilliers; Francoise Derouet, Levallois-Perret, and Guy Lorin, Enghien-les-Bains, all of France, assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Apr. 21, 1975, Ser. No. 569,733

Claims priority, application France, Apr. 22, 1974, 74.13920

Int. Cl.² C23F 7/10

U.S. Cl. 148—6.15 R 3 Claims

1. In a process for forming a crystalline zinc or manganese-based phosphate coating on a metallic surface wherein the surface is contacted with an aqueous acidic solution containing a zinc or manganese phosphate compound, and wherein insoluble sludge is formed during the contact period, the improvement comprising reducing the rate at which sludge is formed by including in the solution 0.005 to 20 g/liter of a phosphoric acid ester in which at least one hydrogen is replaced by an organic condensate radical of the formula:

$$-\left(R''O\right)_n R'$$

wherein

$R''$ = alkyl group of 2 to 3 carbon atoms;

$R'$ = alkyl, oxoalkyl or alkyl phenol group where the alkyl group has 5 to 20 carbon atoms;

$n$ = an integer from 3 to 15.

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3,977,913

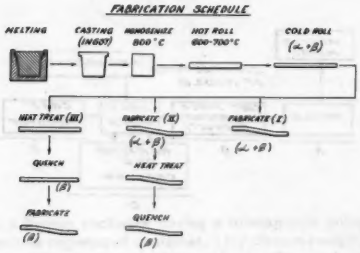
## WROUGHT BRASS ALLOY

Amado Cabo, and Horace Pops, both of Pittsburgh, Pa., assignors to Essex International, Fort Wayne, Ind.

Continuation of Ser. No. 311,218, Dec. 1, 1972, abandoned, which is a division of Ser. No. 107,118, Jan. 18, 1971, abandoned. This application May 27, 1975, Ser. No. 580,804

Int. Cl.² C22F 1/08; C22C 9/04

U.S. Cl. 148—11.5 C 8 Claims




1. A method for manufacture of an improved brass alloy having a low spring back coefficient, said alloy consisting essentially of 0.25% to 3.00% by weight silicon (0.56 to 6.6 atomic %), 25.00% to 40.00% by weight zinc (23.5 to 40.5, atomic %) and the balance copper in a mixed alpha plus beta phase of about 50% ± 20% by weight alpha phase and the balance beta phase, comprising the steps of:

combining said constituents in a substantially homoegeneous mixture,

hot working said constituents at a temperature between 600° and 700° C. and then cold working said alloy at the temperature of normal use.

3,977,914

## METHOD OF DEFORMATION-FREE QUENCHING OF WORK-PIECES HEATED TO HARDENING TEMPERATURE

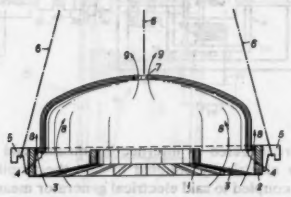
Felix Wallner; Franz Oberhauser, both of Linz; Heinz Mildner, Traun; Heinrich Rudelstorfer, Waxenberg; Berndt Drexler, Linz, and Franz Klicnik, Traun, all of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed July 18, 1974, Ser. No. 489,937

Claims priority, application Austria, July 24, 1973, 6513/73

Int. Cl.² C21D 1/18

U.S. Cl. 148—12.4 9 Claims



1. In a method of quenching a work-piece heated to a hardening temperature essentially without deformation, the work-piece having a wall whose thickness is relatively small in comparison to the diameter thereof and the wall of the work-piece terminating in a free flange, quenching being effected by immersing the entire work-piece into a quenching liquid after removal from a hardening furnace, the improvement of

1. working the free flange of the work-piece until it has been planed,
2. setting the planed free flange of the work-piece upon a plane supporting construction to support the work-piece thereon, the supporting construction being
   a. substantially ring-shaped and
   b. of austenitic, non-scaling chromium-nickel steel material wherein no microstructural alteration of the material occurs between the temperature of the quenching liquid and the hardening temperature,
3. heating the supporting construction and the entire work-piece supported thereon to the hardening temperature, and
4. immersing the entire work-piece supported on the supporting construction into the quenching liquid.

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3,977,915

## METHOD OF HEAT TREATING METAL PARTS

Ronald E. Greenwood, 41 Terrace Drive, Hastings-on-Hudson, N.Y. 10706

Filed Jan. 30, 1975, Ser. No. 545,501

Int. Cl.² C22F 1/00

U.S. Cl. 148—13.1 41 Claims

1. The process of heat treating metal parts comprising:

a. providing a settable ceramic slurry;

b. depositing the metal parts in said slurry;

c. setting said mass of slurry and contained metal parts, so that said set slurry holds and supports the parts in suspension there within;

d. drying said mass;

e. subjecting said mass to heat treating temperatures;

f. cooling the heat treated mass so as to cause said ceramic material to partially disintegrate; and

g. separating the ceramic material from said heat treated parts.

## 3,977,916

## WAX-FLUX COMPOSITION CONTAINING ALKYLARYL SULFONIC ACID FOR SOLDERING

Robert A. Stayner, Lafayette; Richard C. Fox, San Rafael, and Thorton K. Jones, Greenbrae, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Dec. 20, 1974, Ser. No. 534,618
Int. Cl.² B23K 35/34
U.S. Cl. 148—23 13 Claims

1. A wax-flux composition for use in a low-temperature soldering process, comprising:

A. a major amount of a wax having an American melting point between 40° and 100°C; and

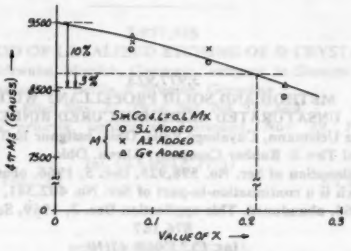
B. an amount effective to cause fluxing, at or below the soldering temperature, of the piece to be soldered in said process of a wax-soluble alkylaryl sulfonic acid.

## 3,977,917

## PERMANENT MAGNET MATERIALS

Yasuo Fujimura, and Masayuki Tada, both of Yokohama, Japan, assignors to Tohoku Metal Industries Limited, Japan

Filed July 31, 1974, Ser. No. 493,396
Claims priority, application Japan, June 17, 1974, 49-69387
Int. Cl.² H01F 1/04
U.S. Cl. 148—31.57 7 Claims




1. A permanent magnet alloy consisting essentially of samarium, cobalt of 4.0–5.2 by atomic ratio to the samarium and an addition of at least one element selected from the group consisting of silicon up to 0.98 by atomic ratio to the samarium, germanium up to 0.57 by atomic ratio to the samarium and aluminum up to 0.82 by atomic ratio to the samarium, at least one of said elements always being present in the alloy in an amount greater than its impurity level in known Sm-Co permanent magnets, said permanent magnet alloy having an intrinsic coercive force which is greater than that of $SmCo_5$ permanent magnet and an irreversible magnetic loss with temperature which is less than that of $SmCo_5$ permanent magnet.

## 3,977,918

## METHOD OF MAKING MAGNETS

Albert E. Paladino, Needham, and Paul F. Weihrauch, Newton Center, both of Mass., assignors to Raytheon Company, Lexington, Mass.

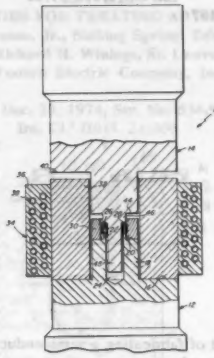
Filed Apr. 7, 1975, Ser. No. 565,972
Int. Cl.² H01F 1/04
U.S. Cl. 148—31.57 5 Claims

5. A magnet made from magnetic powder material in accordance with a method comprising the steps of:

compacting the powder material into a desired configuration while subjecting it to a particle aligning magnetic field;

hot pressing the compacted and aligned material in a confining die at a temperature in the range of about 800° to about 1100°C and pressure in the range of about 1000 to about 10,000 pounds per square inch, said hot pressing temperature and pressure being sufficient to produce substantially unidimensional shrinkage of the material and a packing density greater than 93% of the theoretical maximum value;

heat treating the hot pressed material at a temperature in the range of about 1100° to about 1140°C, said heat treating temperature being sufficiently higher than the hot pressing temperature to produce an enhanced crystallographic alignement and a resulting residual induction greater than 7500 gauss;



annealing the heat treated material at a temperature sufficiently lower than the heat treating temperature to provide a magnetic coercive force greater than $15 \times 10^3$ oersteds;

cooling the annealed material to room temperature in a sufficiently controlled manner to maintain the specified magnetic properties thereof; and

magnetizing the material in a preferred direction to produce an integral magnet having a maximum energy product greater than $16 \times 10^6$ gauss-oersteds.

## 3,977,919

## METHOD OF PRODUCING DOUBLY ORIENTED COBALT IRON ALLOYS

Karl Foster, and Donald R. Thornburg, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 401,766, Sept. 28, 1973, Pat. No. 3,868,278, which is a continuation of Ser. No. 228,070, Feb. 22, 1972, abandoned. This application Dec. 12, 1974, Ser. No. 532,284
Int. Cl.² H01F 1/00
U.S. Cl. 148—121 17 Claims

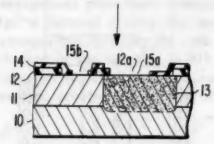
1. In the process of producing improved magnetic characteristics in iron cobalt alloys, the steps comprising making analloy consisting essentially of between about 5% and about 35% cobalt, up to about 2% silicon, less than about 0.3% chromium, less than about % carbon and the balance essentiallyiron with incidental impurities, hot working the alloy at a temperature within the range between about 1000°C and 1100°C to an intermediate gauge, subjecting the intermediate gauge alloy to an annealing treatment at a temperature within the range between about 800°C, cold working the intermediate gauge alloy in one or more steps to the desired finish gauge, at last the last of said cold working steps effecting a reduction in the cross sectional area of the alloy in excess of about 75% and thereafter annealing at a temperature within the range between about 850°C and the $Ac_1$ temperature. Said process being effective for producing a high grain volume of (100) [001] texture by primary recrystalization and normal grain growth.

## 3,977,920

## METHOD OF FABRICATING SEMICONDUCTOR DEVICE USING AT LEAST TWO SORTS OF INSULATING FILMS DIFFERENT FROM EACH OTHER

Ichiro Imaizumi; Tadao Kaji; Akio Hayasaka, all of Kokubunji, and Keijiro Uehara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 193,854, Oct. 29, 1971, Pat. No. 3,850,708. This application Aug. 23, 1974, Ser. No. 500,067
Claims priority, application Japan, Oct. 30, 1970, 45-95083
Int. Cl.[2] H01L *21/22*
U.S. Cl. 148—187 7 Claims




1. A method of fabricating a semiconductor device, comprising the steps of:

a. preparing a semiconductor substrate;

b. forming a first insulating layer on said substrate;

c. forming a first hole in said first insulating layer so as to expose a first surface portion of said substrate;

d. introducing an impurity of a first conductivity type into said first surface portion of said substrate exposed by said first hole;

e. forming a second hole in said first insulating layer so as to expose a second surface portion of said substrate, spaced apart from said first surface portion;

f. forming a second insulating layer on said first insulating layer and on said first and second surface portions of said substrate;

g. forming third and fourth holes in said second insulating layer within the confines of said first and second holes, respectively, to thereby expose at least portions of said first and second surface portions of said substrate said third hole being formed in said second insulating layer so as to expose an edge part of the surface of said first insulating layer which delimits the confines of said first hole; and

h. introducing an impurity of a second conductivity type, opposite said first conductivity type, into the exposed first and second surface portions of said substrate through said third and fourth holes.

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## 3,977,921

## PRIMING NITROMETHANE

Ollie Wayne Chandler, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Continuation-in-part of Ser. No. 442,014, Feb. 13, 1974, abandoned, which is a division of Ser. No. 333,845, Feb. 20, 1973, Pat. No. 3,794,534. This application Jan. 6, 1975, Ser. No. 538,622
The portion of the term of this patent subsequent to Feb. 26, 1991, has been disclaimed.
Int. Cl.[2] C06B *45/00*
U.S. Cl. 149—2 6 Claims

1. A method for priming nitromethane to detonation by strong shock which comprises immersing in said nitromethane an open-celled polymeric foam having a blasting cap in close contact with said polymeric foam.

## 3,977,922

## CAPSULATED EXPLOSIVE COMPOSITIONS

Kazuhiro Inoue, Chita; Hiroshi Sato, Susono, and Fumio Matsui, Chita, all of Japan, assignors to Nippon Oils and Fats Company Limited, Tokyo, Japan

Filed Sept. 4, 1973, Ser. No. 393,979
Claims priority, application Japan, Sept. 9, 1972, 47-90572
Int. Cl.[2] C06B *45/00*
U.S. Cl. 149—2 6 Claims

1. A microencapsulated explosive composition consisting of a high molecular weight compound forming the capsule wall and at least one explosive liquid compound selected from the group consisting of glycerine trinitrate, glycerine dinitrate, ethylene glycol dinitrate, diethylene glycol dinitrate, triethylene glycol dinitrate, trimethylene glycol dinitrate, diglycerine tetranitrate, monochlorohydrin dinitrate, acetylglycerine dinitrate, 1,2,3-butanetriol trinitrate, 2-nitro-2-oxymethyl-1,3-propanediol trinitrate, 2-methyl-2- oxymethyl-1,3-propanediol trinitrate, nitrobenzene and tetranitromethane, forming the core.

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## 3,977,923

## METHOD AND SOLID PROPELLANT WITH UNSATURATED AZIRIDINE CURED BINDER

Heinz Uelzmann, Cuyahoga Falls, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 598,925, Dec. 5, 1966, abandoned, which is a continuation-in-part of Ser. No. 402,341, Oct. 7, 1964, abandoned. This application Dec. 3, 1969, Ser. No. 876,167
Int. Cl.[2] C06B *45/10*
U.S. Cl. 149—19.1 12 Claims

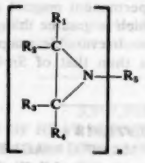
1. A method of producing a solid proplellant which comprises:

A. forming a mixture of:

a. a solid oxidant,

b. a polycarboxylic polymer containing at least two carboxyl groups,

c. a multiaziridinyl hydrocarbon having the formula:




wherein

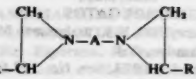
$R_1$, $R_2$, $R_3$, $R_4$ monovalent radicals that may be the same or different selected from the group consisting of hydrogen, 1 to 5 carbon alkyl and 1 to 5 carbon alkenyl,

$R_5$ is a multivalent olefinically unsaturated hydrocarbon radical containing 2 to 24 carbon atoms, and

$n$ is an integer from 2 to 4, and

B. maintaining said mixture at a temperature at which said polycarboxylic polymer and said multiaziridinyl hydrocarbon react to form a copolymeric product.

11. A solid propellant composition comprising a solid oxidizer and the copolymeric reaction product of a polycarboxylic polymer containing at least two carboxyl groups with a multiaziridinyl hydrocarbon having the formula:




wherein A is 4 to 6 carbon atom olefinically unsaturated aliphatic radical and

R is hydrogen or 1 to 3 carbon atom alkyl radical.

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3,977,924

## COOLANT ADDITIVES FOR NITROGEN GENERATING SOLID PROPELLANTS

**Charles R. McCulloch, Shalimar, Fla., and Gerald L. MacKenzie, Port Tobacco, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 1, 1974, Ser. No. 456,703**

**Int. Cl.² C06B** *45/10, 35/00, 33/06, 29/12*

**U.S. Cl. 149—19.3** **13 Claims**

1. A gas generating solid propellant comprising sodium azide, a fluorocarbon binder material, a combustion catalyst selected from the group consisting of a finely divided colloidal silicon dioxide, a finely divided carbon black, and mixtures thereof, an alkaline metal acid salt coolant, a halogen substituted organic acid salt and an oxidizer.

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3,977,925

## METHOD OF LOCALIZED ETCHING OF Si CRYSTALS

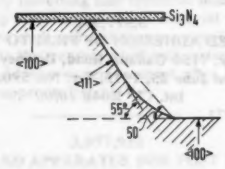
**Ulrich Schwabe, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Nov. 27, 1974, Ser. No. 527,894**

**Claims priority, application Germany, Nov. 29, 1973, 2359511**

**Int. Cl.² H01L** *21/31*

**U.S. Cl. 156—13** **5 Claims**




1. A process for producing a semiconductor arrangement from a monocrystalline silicon substrate for use in an integrated circuit, comprising:

orientating a monocrystalline silicon substrate so that a (100)-plane of the silicon crystal lattice substantially coincides with a surface of the substrate being etched;

applying a protective etch mask onto the orientated substrate surface to be etched, said etch mask having a pattern of groove-shaped openings therein; and

contacting the masked orientated surface with a liquid etchant at a temperature in the range of about 18° to 30°C. and for a time period sufficient to from groove-shaped recesses in the masked orientated surface in accordance with said pattern of openings in the etch mask, said groove-shaped recesses having side walls which are obliquely inclined relative to the masked orientated surface so that the angle between the masked orientated surface and said side walls is larger than about 90°, said liquid etchant being composed of a mixture of HF, $HNO_3$, $CH_3COOH$ and $H_2O$ wherein for every 4 gr of HF present in said mixture, there are 100 gr of $HNO_3$, 110 gr ± 20% of $CH_3COOH$ and 20 gr ± 50% of $H_2O$.

5. A method as defined in claim 1 including etching a trench-like recess between two elements of a circuit arrangement on said substrate, said trench-like recess forming a portion of the recesses etched in the substrate surface;

applying an insulating layer of $SiO_2$ in said trench-like recess so that said insulating layer extends beyond both sides of said recess; and

applying an electrical conductor path onto said insulating layer and across said recess so as to electrically connect said elements on opposite sides of said recess.

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3,977,926

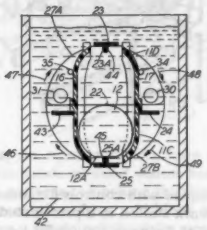
## METHODS FOR TREATING ARTICLES

**Anderson F. Johnson, Jr., Sinking Spring; Edward L. Stork, Ephrata, and Richard H. Winings, St. Lawrence, all of Pa., assignors to Western Electric Company, Inc., New York, N.Y.**

**Filed Dec. 20, 1974, Ser. No. 534,918**

**Int. Cl.² H01L** *21/306*

**U.S. Cl. 156—17** **14 Claims**




12. A method of treating semiconductor wafers comprising the steps of:

holding a plurality of wafers by only peripheral portions thereof in mutually spaced substantially parallel relationship in a corresponding plurality of slots in a first carrier used for conveying the wafers to and from the treating workplace, the carrier having an open face for insertion and removal of the wafers;

abutting the open face of the first carrier to the open face of an empty second carrier having at least the corresponding plurality of slots such that the slots of the first carrier are substantially aligned with the slots of the second carrier, each pair of aligned slots providing an elongated enclosure for confining and treating the articles;

submersing the carriers and wafers contained therein in a treating medium such that an axis lying in a plane defined by the abutted faces is substantially horizontal and the wafers are held in a vertical plane; and

rotating the submersed carriers about said axis at a speed of rotation sufficient to cause rotational and translational movement of the wafers through said axis and back and forth between the carriers.

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3,977,927

## MACHINE AND METHOD FOR MAKING CAMOUFLAGE NETS

**Homer C. Amos, Palm Springs, Calif.; Samuel R. Callis, Marion, and Charles R. Scott, Sugar Grove, both of Va., assignors to Brunswick Corporation, Skokie, Ill.**

**Filed Jan. 13, 1975, Ser. No. 540,495**

**Int. Cl.² B44D** *5/10*

**U.S. Cl. 156—61** **13 Claims**

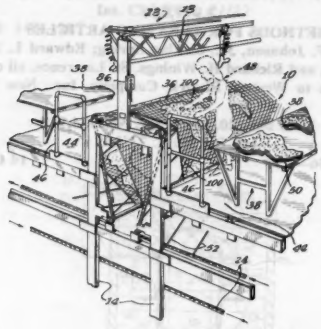
1. A machine used in the assembly of a garnish to a net to form a camouflage net comprising:

a. a frame having a pair of spaced conveyor chains;

b. a plurality of legs supporting the frame;

c. a plurality of first work stations mounted on work supports on the upper side of the frame, the supports comprising work surfaces raised at the center and rollers along each elongated lower edge;

d. a plurality of second work stations located under the frame;
e. a plurality of garnish support tables adjacent the first work stations mounted on the frame;
f. a plurality of bias means secured to the chains for attaching the net to the machine and means for maintaining the net in a taut condition;



g. drive means coupled with controls for indexedly moving the net to the work station in a preselected manner;
h. means provided at the work station for locating the position of the garnish to be attached to the net; and,
i. means for attaching the garnish to the net.

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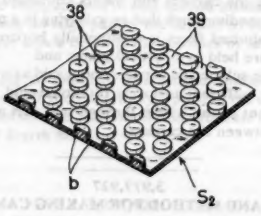
3,977,928

## PROCESS AND APPARATUS FOR PRODUCING A SOFT FIBROUS SHEET

Saburo Odagiri, Yokohama, and Jiro Hirano, Omiya, both of Japan, assignors to Kabushiki Kaisha Tomoku, Otaru, Japan

Filed Aug. 15, 1974, Ser. No. 497,632
Claims priority, application Japan, Aug. 18, 1973, 48-92094
Int. Cl.² B31F 1/00
U.S. Cl. 156—62.2 2 Claims



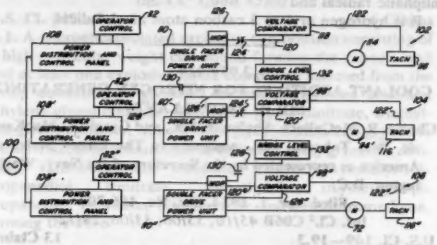

1. A process for manufacturing a soft fibrous sheet comprising the steps of: dispersing finely crushed fibers to form a sheet layer of crushed fibers, said sheet layer having substantially uniform thickness and large width; impregnating said sheet layer with an adhesive agent; thereafter heating and compressing said sheet layer; embossing shock-absorbing projections on the surface of said sheet layer; laminating at least one side surface of said sheet layer with a substantially thin sheet member, said heating and compressing step occurring through said thin sheet member; and forming shock-absorbing projections on the surface of said sheet layer during said heating and compressing, said thin sheet member comprising paper, said laminating, heating, compressing and embossing steps being carried out substantially simultaneously.

3,977,929

## CORRUGATOR

Donald J. Evans, Cherry Hill, N.J., assignor to Molins Machine Company, Inc., Camden, N.J.

Filed June 13, 1973, Ser. No. 369,632
Int. Cl.² G05G 15/00
U.S. Cl. 156—64 12 Claims



1. A method of making corrugated paperboard comprising making single faced paperboard in a single facer machine, feeding the single faced paperboard to a bridge, removing the single faced paperboard from the bridge and joining the single face board to a liner at a double facer machine, the improvement comprising producing a first signal indicative of the actual speed of the drive motor of the single facer machine, producing a second signal indicative of the actual speed of the drive motor of the double facer machine, producing a reference signal indicative of a desired speed, comparing the first signal with the reference signal and producing a first output signal, automatically adjusting the speed of the single facer drive motor in response to said first output signal, comparing the second signal with the reference signal and producing a second output signal, and automatically adjusting the speed of the double facer drive motor in response to said second output signal.

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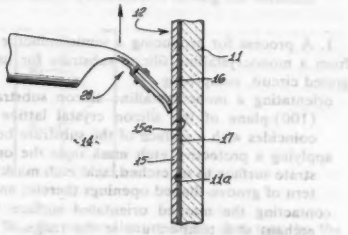
3,977,930

## OIL BASED ADHESION OF FILM TO WINDOW

John C. Hunter, 9150 Gallatin Road, Downey, Calif. 90240

Filed June 25, 1975, Ser. No. 590,053
Int. Cl.² E04F 10/00
U.S. Cl. 156—71 8 Claims

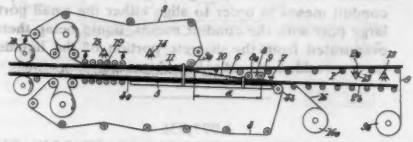



1. The method of reducing heat transmission through a solid window, that includes,
a. providing a light transparent plastic sheet having a transparent metal layer on one surface of the sheet, the layer characterized as reflective to incident heat radiation, and applying the sheet to the window, and
b. providing a mineral oil film at the interface between the sheet metal layer and window to retain the sheet to the window, and
c. smoothing the sheet to eliminate any bubbles that form at the interface.

## 3,977,931
## METHOD AND MACHINE FOR THE CONTINUOUS MANUFACTURE OF PANELS

**Jean-Marie Peille, Esperaza, France, assignor to Societe de Participations Etudes et Realisations (SPER), Esperaza, France**

**Filed Aug. 22, 1974, Ser. No. 499,709**
**Claims priority, application France, Aug. 28, 1973, 73.31116**
**Int. Cl.² B32B 5/20**
**U.S. Cl. 156—78** **3 Claims**



1. A process for the continuous production of panels having a core of expandable synthetic material distributed in the form of a reactive liquid passing into a gel-like state and then into a solid state, a lower facing, an upper facing, at least one of said facings being formed of a rigid material compatible for adhering on contact with the synthetic material during the gel-like state, said process comprising the steps of:

placing on said lower facing said expandable synthetic material in liquid form;

applying to the top of said synthetic material during its liquid state a sheet of non-woven material, relatively porous, which can be progressively transversed by said synthetic material;

submitting said synthetic material during its liquid state and said sheet of non-woven material to a gauging operation before said non-woven material is traversed by said synthetic material;

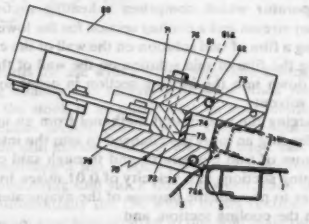
permitting said synthetic material to freely expand thereby progressively traversing said synthetic material after said gauging step until said synthetic material changes into a gel-like state and said non-woven material has become sticky due to the transversal of said material; and

applying to said non-woven material after it has become sticky said upper facing.

## 3,977,932
## METHOD AND APPARATUS FOR POST FORMING LAMINATES

**Bernard J. Fries, Jenison, and Lance E. Molander, Grand Rapids, both of Mich., assignors to Steelcase, Inc., Grand Rapids, Mich.**

**Division of Ser. No. 386,533, Aug. 8, 1973, Pat. No. 3,888,613. This application Feb. 3, 1975, Ser. No. 546,311**
**Int. Cl.² B29C 17/04**
**U.S. Cl. 156—212** **28 Claims**



1. A method for post forming laminate tops comprising: heating the overhanging portion of a sheet of laminate mounted on a substrate in a heater having an ambient temperature of approximately 550° to 750° F. for a period of approximately 10 to 16 seconds; removing said overhanging laminate from said heater immediately at the end of said period of time and then immediately and rapidly forming said overhanging laminate over said substrate periphery.

## 3,977,933
## SLICED VENEER HAVING A COMBINATION OF WOOD GRAIN PATTERNS AND FANCY PLYWOOD THEREFROM

**Takeshi Sadashige, 712-5, Ugai-cho, Fuchu, Hiroshima, Japan**

**Filed Sept. 6, 1974, Ser. No. 503,896**
**Claims priority, application Japan, Oct. 3, 1973, 48-111778**
**Int. Cl.² B32B 31/00**
**U.S. Cl. 156—250** **11 Claims**

1. A process for mass-producing from a block of wood a plurality of thin sheets of wood veneer having a combination of wood grain patterns comprising the steps of cutting out an elongated pattern piece from said block of wood, said block of wood having a height substantially greater than the thickness of the veneer to be produced, said elongated pattern piece being symmetrical about an imaginary longitudinal plane and having a longitudinal length corresponding to the height of said block of wood, removing said elongated pattern piece from said block of wood by withdrawing said elongated pattern piece parallel to its longitudinal axis to thereby leave remaining in said block of wood an elongated hole, inserting said elongated pattern piece into a corresponding elongated hole in a block of wood, said elongated hole being symmetrical about an imaginary longitudinal plane and having a cross sectional configuration corresponding to the cross sectional configuration of said elongated pattern piece, said elongated pattern piece being inserted in said elongated hole in a position different from the original position such that the grain of said elongated pattern piece and the grain in said block of wood in which the elongated pattern piece is inserted is discontinuous to thereby provide a visual contrast therebetween, securing said elongated pattern piece within said elongated hole utilizing an adhesive, cutting a plurality of relatively thin slices of wood veneer from said block of wood in a direction generally transversely of said imaginary dividing plane of said elongated pattern piece and of said elongated hole in which said elongated pattern piece is inserted, whereby said plurality of relatively thin slices of wood veneer embody contrasting wood grain patterns of said elongated pattern piece and said block of wood, and carrying out the above mentioned steps while maintaining the moisture content of said block of wood and said elongated pattern pieces at or above the fiber saturation point.

10. A process for producing fancy plywood comprising the step of gluing at least one slice of veneer made according to the method of claim 1 onto a wood substrate.

## 3,977,934
## SILICON MANUFACTURE

**Arnold Lesk, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

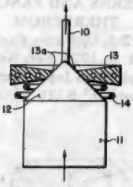
**Filed Jan. 2, 1975, Ser. No. 537,984**
**Int. Cl.² B01J 17/18, 17/10**
**U.S. Cl. 156—608** **4 Claims**

1. A method of producing monocrystalline semiconductor

material in web form from a polycrystalline semiconductor source which comprises:

forming a molten zone of semiconductor material from said polycrystalline source,

contacting the molten zone with a thermal profile shaping member of the same material as the semiconductor material to be produced,




drawing monocrystalline semiconductor material from said molten zone through said thermal shaping member, and replenishing said molten zone from said polycrystalline semiconductor material source as said monocrystalline semiconductor material is drawn from said molten zone.

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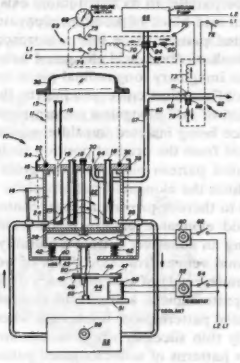
3,977,935

## METHOD AND APPARATUS FOR EVAPORATING LIQUIDS

Allen Avinoam Kowarski, 2405 Sugarcane Road, Baltimore, Md. 21209

Filed Sept. 25, 1974, Ser. No. 509,270
Int. Cl.² B01D 1/00
U.S. Cl. 159—23 27 Claims



1. Apparatus for separating liquids from solid substances to form a residue of said substances, comprising:

an enclosure means;

support means within said enclosure means for supporting at least one discrete portion of said liquids;

pump means connected to said enclosure means for evacuating gaseous matter from within the enclosure means; and,

valve means between said pump means and said enclosure means, the valve means comprising

conduit means disposed between the pump means and the enclosure means,

port means disposed in the conduit means for restrictively controlling the evacuation of gaseous matter from the enclosure means, the port means including a relatively small port movable into alignment with the conduit means to restrict the flow of gaseous matter from said enclosure means in order to create subatmospheric pressure therein at a first pressure level, the port means further including a relatively larger port movable into alignment with the conduct means subsequent to the establishment of said subatmospheric pressure level within the enclosure means to restrict the flow of gaseous matter from said enclosure means in order to create subatmospheric pressure at a second relatively lower pressure level within the enclosure means, and

actuation means for moving the port means within the conduit means in order to align either the small port or large port with the conduit means, liquid being thereby evaporated from the discrete portion of the liquids to leave a residue of said solid substances.

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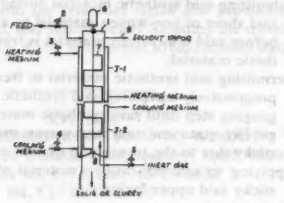
3,977,936

## METHOD FOR THE CONTINUOUS CRYSTALLIZATION OF A SOLID COMPONENT WITH A CENTRIFUGAL FILM EVAPORATOR

Ryuzo Murakami; Shigeaki Kato, and Yoshihiro Kaya, all of Tokuyama, Japan, assignors to Shunan Petrochemical Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 443,519, Feb. 19, 1974, abandoned.
This application Sept. 9, 1975, Ser. No. 611,706
Claims priority, application Japan, Feb. 23, 1973, 48-21851
Int. Cl.² B01D 1/22
U.S. Cl. 159—49 1 Claim




1. In a method for the continuous crystallization of a solid material by continuously feeding a solution of the solid material in water or an organic solvent to a centrifugal film evaporator equipped with a scraper blade, an exterior upper heating jacket and a lower downstream cooling jacket, the improvement comprising:

feeding a solution of piperazine in methanol or triethylenediamine in methanol to and down from the top of the evaporator which comprises a heating section for the upper stream and a cooling section for the lower stream;

forming a film of said solution on the wall of the evaporator;

passing the film of said solution on the wall of the evaporator down into the heating section in order to evaporate the solvent;

discharging the evaporated methanol from an upper outlet by feeding an inert gas changed to into the interior of the bottom of said evaporator and through said cooling and heating sections at a velocity of 0.01 m/sec to 5 m/sec in order to prevent the passage of the evaporated methanol into the cooling section; and

allowing the concentrated solution to contact the cooling section of said evaporator, whereby a crystallized solid or slurry of piperazine or triethylenediamine respectively, is formed.

3,977,937

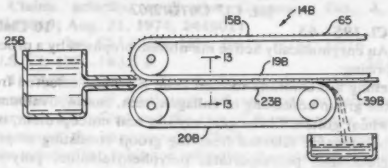
## SYSTEM FOR MAKING A NON-WOVEN SHEET BY CREATING AN ELECTROSTATIC FIELD ACTION

James T. Candor, 5440 Cynthia Lane, Dayton, Ohio 45429

Continuation-in-part of Ser. No. 405,023, Oct. 10, 1973. This application Jan. 15, 1975, Ser. No. 541,218

Int. Cl.[2] D21F *1/00*, *11/00*

U.S. Cl. 162—192 20 Claims




1. A method of making a non-woven sheet comprising the steps of providing a slurry of liquid and fibers, forming said slurry into sheet-like form by flowing said slurry against and between two spaced apart first and second surfaces, creating an electrostatic field action that acts on said sheet-like form between said two surfaces and causes at least part of said fibers to be arranged into a sheet adjacent said first surface and at least part of said liquid to be arranged adjacent said second surface, and causing needle-like projections of one of said surfaces to project at least partially into said sheet-like form and assist said electrostatic field action in forming said sheet adjacent said first surface.

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3,977,938

## SUPPORT BEAM FOR THE RECTIFIER SECTION OF A HEADBOX

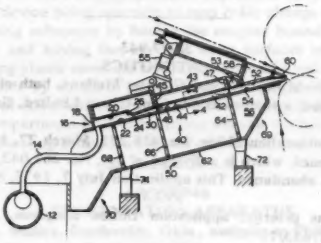
John Gilbert Descary, Lachine, and Ramamurthy Gopal Krishnan, Montreal, both of Canada, assignors to Dominion Engineering Works, Limited, Lachine, Canada

Continuation-in-part of Ser. No. 362,082, May 21, 1973, Pat. No. 3,878,039. This application Mar. 6, 1975, Ser. No. 556,118

The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.

Int. Cl.[2] D21F *1/02*

U.S. Cl. 162—343 3 Claims



1. Apparatus for use with a paper machine, having a headbox mixing chamber to receive a flow of stock therein for passage of the stock to an outlet slice, in combination with a shallow rectifier section positioned in stock conducting relation between said mixing chamber and said slice, said rectifier section comprising a top section plate and a bottom section plate for conducting said stock therebetween, each said plate extending substantially the full width of the rectifier section, a support beam structure secured to one said plate on the side thereof remote from the other said plate, to provide structural support to said one plate against deflection thereof when the apparatus is in use, and a plurality of load transfer divider wall means positioned across the width of the rectifier section in mutually spaced relation to divide the space between said top and bottom plates into a plurality of substantially parallel flow channels, said divider wall means securing said top plate to said bottom plate in tied, deformation resisting relation along the length of said channels, to transfer the stiffness of said beam structure to the other said plate for substantially the full length of the rectifier section between said mixing chamber and said slice.

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3,977,939

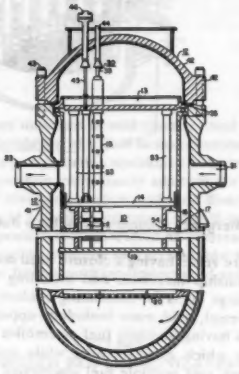
## NUCLEAR REACTOR INTERNALS ARRANGEMENT

Erling Frisch, deceased, late of Pittsburgh, Pa., by Dorothy Randall Frisch, administratrix, and Harry N. Andrews, Franklin Township, Westmoreland County, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 15, 1973, Ser. No. 406,454

Int. Cl.[2] G21C *7/08*

U.S. Cl. 176—36 R 16 Claims



1. In a nuclear reactor, a reactor vessel having a removable closure head, a core containing nuclear fuel positioned within said reactor vessel, support apparatus for structurally supporting said core within said reactor vessel, a plurality of control rods for controlling the operation of said reactor, said control rods being mounted to said closure head for movement into and out of said core from the upper end thereof, and openings in a wall of said reactor vessel for ingress and egress of a reactor coolant flowing through said core, said support apparatus including an upper core support which is operatively connected to the upper end of said core, means for storing said control rods within said upper core support upon withdrawal of the control rods from the core, whereby upon removal of said upper core support, said withdrawn control rods being stored therein are also removed, thereby exposing said core, said upper core support including a downwardly extending peripheral open-ended skirt thereon which is located outwardly of and coextends with an upper portion of said core and receives said upper core portion through the open end of said skirt.

3,977,940

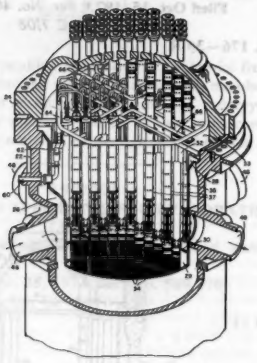
## EMERGENCY COOLING SYSTEM FOR NUCLEAR REACTORS

Erling Frisch, deceased, late of Pittsburgh, Pa., by Dorothy Randall Frisch, administratrix, and Harry N. Andrews, Franklin Township, Westmoreland County, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 259,327, June 2, 1972, abandoned. This application July 23, 1974, Ser. No. 491,077

Int. Cl.[2] G21C 9/00

U.S. Cl. 176—38 9 Claims



1. An emergency cooling system for a nuclear reactor comprising:

a pressure vessel having a closure head secured in fluid-tight relationship therewith and including liquid supply and discharge ducts for circulating coolant through a core in the vessel, said core including upper and lower core plates having multiple fuel assemblies disposed therebetween which generate heat while undergoing a fission process; said multiple fuel assemblies including selected fuel assemblies containing fuel elements with guide thimbles interspersed therebetween and other fuel assemblies containing fuel elements and guide thimbles having control rods reciprocally movable therein, said control rods being the only control rods present in said nuclear reactor;

emergency coolant inlet piping connected at one end to coolant supply means containing emergency coolant under high pressure and its other end to a manifold mounted within the reactor vessel;

piping extending from the manifold to distributor means mounted on said upper core plate above only said selected fuel assemblies in the pressure vessel;

said distributor means including a support base mounted on said upper core plate surmounting each selected fuel assembly, and laterally extending emergency coolant passageways in said base;

means connecting each of said passageways with a corresponding guide thimble mounted in each said selected fuel assembly; and

each of said corresponding guide thimbles in selected fuel assemblies having openings in the walls thereof, which openings are spaced along the guide thimble length and are located in a position to spray emergency coolant against the fuel elements in said selected fuel assemblies to absorb heat generated by said fuel elements.

3,977,941

## PROTEIN-ENZYME COMPLEX MEMBRANES

Wolf R. Vieth, Belle Mead; Shaw S. Wang, North Brunswick, and Seymour G. Gilbert, Piscataway, all of N.J., assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 135,753, April 20, 1971, Pat. No. 3,843,446. This application Feb. 4, 1974, Ser. No. 439,110

The portion of the term of this patent subsequent to Oct. 22, 1991, has been disclaimed.

Int. Cl.[2] C07G 7/02

U.S. Cl. 195—63 10 Claims

1. An enzymatically active membrane prepared by a process comprising:

swelling a membrane formed from a protein selected from the group consisting of collagen, zein, casein, ovalbumin, wheat gluten, fibrinogen, myosin and mucoprotein, or a polypeptide selected from the group consisting of polyglutamate, polyaspartate, polyphenylalanine, polytyrosine and copolymer of leucine and p-amino phenylalanine to its maximum capacity;

soaking said swollen membrane in a enxyme-containing solution at a temperature of 4°–20°C for a period of 10 hours to 2 days at a pH between the isoelectric points of the enzyme and the polypeptide or protein membrane, thereby bonding said enzyme directly to said protein polypeptide of said membrane by the accumlative effects of van der Waals interactions, hydrogen bonding and salt linkages;

and thereafter drying said enzyme membrane complex.

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3,977,942

## FERMENTATION OF CEPHAMYCIN C

Edward Inamine, Rahway, and Jerome Birnbaum, Morganville, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 21, 1975, Ser. No. 634,106

Int. Cl.[2] C12D 9/00

U.S. Cl. 195—80 R 9 Claims

1. In the process for preparing cephamycin C by growing a cephamycin C producing species of Streptomyces in a nutrient medium, the improvement which comprises the addition of the amino acid D- or DL-arginine, D- or DL-ornithine or one of several polyamines selected from the group consisting of 1,3-diaminopropane; 1,3-diamino-2-hydroxypropane; N-methyl-1,3-diaminopropane, agmatine, spermidine, spermine, cadaverine and putrescine to the nutrient medium.

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3,977,943

## ANTIBIOTICS

Kevin David Barrow, and Graham Mellows, both of London, England, assignors to Beecham Group Limited, Great Britain

Continuation of Ser. No. 455,291, March 27, 1974, abandoned, which is a division of Ser. No. 261,042, June 8, 1972, abandoned. This application July 7, 1975, Ser. No. 593,322

Claims priority, application United Kingdom, June 12, 1971, 27653/71

Int. Cl.[2] A21K 21/00

U.S. Cl. 195—96 14 Claims

1. A process for the preparation of antibacterially active substances which process comprises growing *Pseudomonas fluorescens* under aerobic conditions on or in a culture medium containing inorganic salts and sources of assimilable carbon and nitrogen until the culture medium exhibits at least detectable antibacterial activity, thereafter adding a source of barium ions to the culture and removing the resultant precipitated material therefrom, extracting the culture medium with an organic solvent for the active materials dissolved in the culture medium, extracting the resultant organic solution with an aqueous alkaline solution, and isolating therefrom the antibacterially active fraction.

3,977,944

## ENZYME-KINETIC DETERMINATION OF THE CONCENTRATION OF A SUBSTRATE

**Reinhard Müller-Matthesius, Hamburg-Norderstedt, and Wolfgang Gruber, Unterzeismering, both of Germany, assignors to Eppendorf Geratebau Netheler & Hinz GmbH, Hamburg and Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, both of, Germany**

**Filed Oct. 2, 1974, Ser. No. 511,402**

**Claims priority, application Germany, Oct. 4, 1973, 2349819; Aug. 21, 1974, 2440011**

**Int. Cl.² C12K *1/04*; G01N *31/14, 33/16***

**U.S. Cl. 195—103.5 R** **25 Claims**

1. Method for the enzyme-kinetic determination of the concentration of a substrate wherein one or more specific enzymes are added and the rate of the enzymatic reaction is measured, the improvement which comprises adding at least one competitive inhibitor inhibiting the rate determining step of the enzymatic substrate reaction to bring the ratio of the substrate concentration $c_S$ to the apparent Michaelis constant $K_M'$ of the inhibited enzymatic reaction to 0.2 : 1 or less, thereby establishing the conditions of a pseudo-first order reaction, homogenizing the mixture, determining the change in a reaction parameter specific for the reaction at certain intervals of time, and calculating the concentration of the substrate to be detected therefrom.

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3,977,945

## TIME AND TEMPERATURE-DEPENDENT ENZYMATIC INDICATOR

**Sven Ivan Arvid Törnmarck, Malmo, Sweden, assignor to Food Control AB, Malmo, Sweden**

**Filed Feb. 20, 1975, Ser. No. 551,439**

**Claims priority, application Sweden, Feb. 21, 1974, 7402282**

**Int. Cl.² C12K *1/04, 1/00*; A23L *3/00*; G01N *31/14***

**U.S. Cl. 195—127** **9 Claims**

1. In a time and temperature-dependent enzymatic indicating device for indicating the storage conditions of storage-sensitive perishable products comprising an aqueous liquid containing an enzyme, a substrate capable of being acted on by said enzyme to produce reaction products, and a pH indicating substance which changes color for indicating a change in pH resulting from action of said enzyme on the substrate, said aqueous liquid being enclosed in a surrounding plastic envelope having opposed inner surfaces, the improvement comprising the time and temperature-dependent enzymatic indicating device being operable to stop color change of said pH indicating substance by having the enzyme bound to a solid carrier and having the opposed inner surfaces of said surrounding plastic envelope comprise a layer of a material which is sealable by means of pressure whereby said indicating device is divisible into separate compartments including at least one compartment free from enzyme wherein further change of said indicating substance can not continue.

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3,977,946

## FERMENTATION APPARATUS

**Emil A. Malick, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jan. 24, 1975, Ser. No. 543,793**

**Int. Cl.² C12B *1/16***

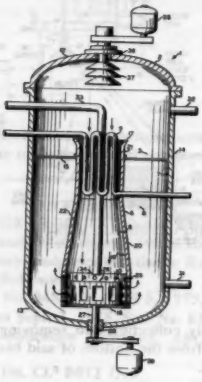
**U.S. Cl. 195—142** **5 Claims**

1. A fermentation apparatus comprising:

a. a vessel having a chamber therein adapted to contain a fluid and having a wall partially defining said chamber, said vessel having first and second ends;

b. a draft tube mounted in said chamber between said first and second ends and is spaced from said vessel wall forming a first flow path therebetween, said draft tube has a second flow path therethrough and has a generally cylindrical first portion adjacent an upstream end and has a downstream diverging portion which continues on downstream from the first cylindrical portion, said draft tube having a second cylindrical portion continuing downstream from said diverging portion, said second cylindrical portion having a plurality of through aperatures communicating between said first and second flow paths;

c. heat exchange means mounted in said chamber in a portion of the second flow path formed by the first cylindrical portion;



d. pump means mounted in said chamber and operable for effecting circulation of a fluid in said chamber, said pump means has a pump portion positioned between the second end and a position immediately adjacent the downstream end of said diverging portion with said diverging portion terminating at a position upstream of said pump portion, said pump portion is remote from an upstream end of the diverging portion whereby said second flow path diverges downstream from a position upstream of said pump portion.

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3,977,947

## FLUIDIZED BED CARBONIZATION

**Owen Pyle, Anchorage, Ky., assignor to The Kingsford Company, Louisville, Ky.**

**Continuation-in-part of Ser. No. 275,366, July 26, 1972, abandoned, and a continuation-in-part of Ser. No. 347,993, April 5, 1973, Pat. No. 3,938,965, which is a continuation-in-part of Ser. No. 279,767, Aug. 11, 1972, Pat. No. 3,950,143, which is a continuation-in-part of Ser. No. 271,795, July 14, 1972, Pat. No. 3,852,248. This application May 25, 1973, Ser. No. 364,135**

**Int. Cl.² C10B *47/00, 21/18, 1/04*; C10J *3/00***

**U.S. Cl. 201—27** **11 Claims**

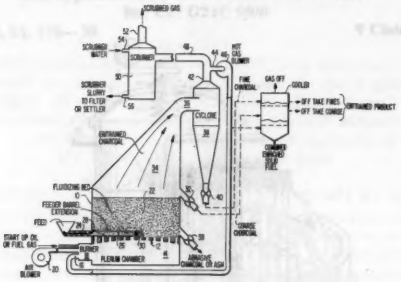
1. A process for carbonizing particulate woody materials to produce a substantially pollution-free solid fuel having a low, relatively nonabrasive ash content comprising the steps of:

providing a dense phase fluidized bed of hot previously carbonized woody materials in a closed vessel having a porous grid immediately below said bed, a plenum chamber below said grid, and a source of heated gas in communication with said chamber, providing a fluidizing combustion supporting medium for said bed;

continuously injecting particulate woody materials small enough to pass through about a ¼ inch screen into substantially the bottom central portion of the dense phase of said bed at at least one feed point spaced substantially equally and horizontally from opposed vertical walls of said vessel and immediately super adjacent said grid;

continuously collecting and removing a dispersed phase of fine charcoal entrained in carbonization offgas above said bed without heating said dispersed phase; and

separating at least a portion of said fine charcoal from said gas, and collecting said charcoal for use as a solid fuel;



continuously collecting and removing a coarse, high ash fraction from the bottom of said bed immediately above said grid.

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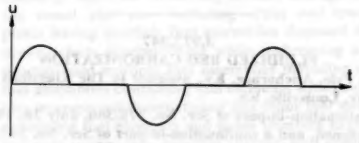
**3,977,948**

## PROCESS FOR COLORING, BY ELECTROLYSIS, AN ANODIZED ALUMINUM OR ALUMINUM ALLOY PIECE

**Dionisio Rodriguez Martinez, Pamplona, Spain, assignor to Iongraf, S.A., Spain**

**Continuation of Ser. No. 444,547, Feb. 20, 1974, abandoned.**
**This application Aug. 28, 1975, Ser. No. 608,774**
**Int. Cl.² C25D 11/22**
**U.S. Cl. 204—35 N** **13 Claims**



1. A process for coloring an aluminum or aluminum alloy piece previously subjected to anodic oxidation, said process comprising:

placing said piece in a bath containing the salt of at least one fundamental metal selected from the group consisting of nickel, cobalt and cadmium and the salt of at least one auxiliary metal selected from the group consisting of copper and tin;

maintaining the pH of said bath no greater than 1.8;

maintaining the concentration of the auxiliary metal salts in said bath lower than 2.5 g/l;

maintaining the concentration of the fundamental metal salts in said bath lower than 200 g/l;

stirring said bath; and

applying between said piece and a counterelectrode immersed in said bath an alternating voltage which, with respect to a period N, is sinusoidal and positive for 0.5 N, zero for 0.5 N, sinusoidal and negative for 0.5 N, and zero for 0.5 N.

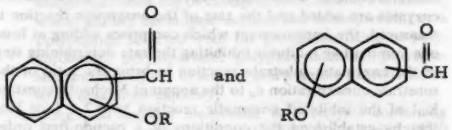
**3,977,949**

## ACIDIC PLATING BATH AND ADDITIVES FOR ELECTRODEPOSITION OF BRIGHT TIN

**William E. Rosenberg, Strongsville, Ohio, assignor to Columbia Chemical Corporation, Cleveland, Ohio**

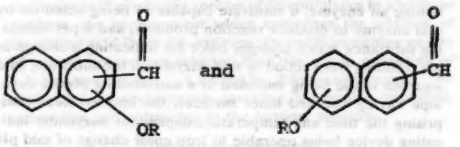
**Filed July 7, 1975, Ser. No. 593,311**
**Int. Cl.² C25D 3/32**
**U.S. Cl. 204—54 R** **25 Claims**

1. A primary tin plating brightener additive, comprising an alkoxy naphthalene carboxaldehyde of the following general formula:



where R is methyl, ethyl, propyl, or isopropyl, and including from 1 to about 97 percent of at least one compound selected from the group consisting of alpha unsaturated carboxylic acids, amides, and esters for producing bright electrodeposits of tin from an aqueous, acid plating bath.

5. An aqueous, acid tin electroplating bath containing stannous ions and sulfuric acid, comprising having dissolved therein as a brightener compound about 0.01 to about 0.2 grams/liter of an alkoxy naphthalene carboxaldehyde of the following general formula:



where R is methyl, ethyl, propyl, and isopropyl.

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**3,977,950**

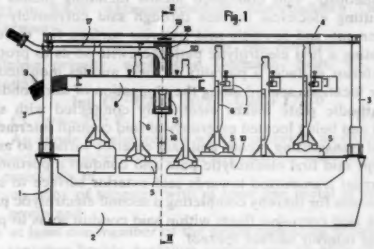
## PROCESS AND APPARATUS FOR COLLECTION OF GASES

**Pierre Tortil, Saint-Jean-de-Maurienne, France, assignor to Aluminum Pechiney, Lyon, France**

**Filed Jan. 17, 1975, Ser. No. 542,034**
**Claims priority, application France, Feb. 28, 1974, 74.06756**
**Int. Cl.² C25C 3/06, 3/14**
**U.S. Cl. 204—67** **7 Claims**

1. A process for the collection of gases from a tank used in the production of aluminum by igneous electrolysis, comprising; piercing a hole in the crust which normally covers the

electrolytic solution with a movable shaft, maintaining the hole thus formed in the crust open, maintaining a flow of at least coolant gas about the shaft in admixture with the gases emitted through said hole and collecting the released gases.

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3,977,951

## ELECTROLYTIC CELLS AND PROCESS FOR TREATING DILUTE WASTE SOLUTIONS

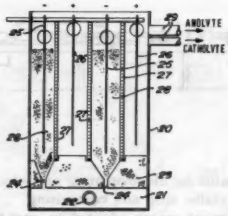
Carlos Lopez-Cacicedo, Wirral, England, assignor to The Electricity Council, London, England

Filed Sept. 20, 1974, Ser. No. 508,027

Claims priority, application United Kingdom, Sept. 24, 1973, 44650/73

Int. Cl.² C02B *1/82;* C25D *17/12*

U.S. Cl. 204—149 19 Claims




19. In a method of removing metal from a dilute solution of a metal salt by electrolysis of the solution in a cell having a cathode and an anode between which an electric current is passed, the improvement comprising the steps of using, as the cathode, an apertured metal structure and fluidising, by flow of said solution, non-conductive particles, of a size smaller than the apertures in the cathode, in the region adjacent the surface of the cathode facing the anode.

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3,977,952

## PROCESS FOR DECOMPOSING CARBON-CONTAINING COMPOUNDS

Kurt Knoevenagel, and Rolf Himmelreich, both of Grunstadt, Germany, assignors to C. F. Spiess & Sohn, Kleinkarlbach, Germany

Filed Aug. 12, 1974, Ser. No. 496,674

Claims priority, application Germany, Aug. 16, 1973, 2341300; Feb. 23, 1974, 2408788

Int. Cl.² B01J *1/10;* B01K *1/00*

U.S. Cl. 204—157.1 R 12 Claims

1. A process for the decomposition of a carbon-containing compound substantially completely to carbon dioxide which comprises exposing to radiation of a wave length of about 20 to 600 nm a mixture consisting essentially of said compound with water containing a catalytic amount of hydrogen chloride

while supplying oxygen in excess of the stoichiometric amount required for complete oxidation of said compound.

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3,977,953

## PROCESS FOR THE PRODUCTION OF HULUPONES

Hubert Frhr. Von Hirsch, Munich, and Alfons Hartl, Germering, both of Germany, assignors to Atlantic Research Institute Ltd., Nassau, Bahamas

Continuation of Ser. No. 348,305, April 5, 1973, abandoned. This application Sept. 3, 1975, Ser. No. 610,010

Claims priority, application Germany, Apr. 10, 1972, 2217135

Int. Cl.² B01J *1/10*

U.S. Cl. 204—158 R 21 Claims

1. A process for the conversion of lupulones into a hulupone-containing beer-soluble bitter-tasting product, comprising:

combining the lupulones and at least one sensitizing dye in a liquid alkaline medium adjusted to a starting pH of 11–14;

oxidizing the lupulones by means of a gas, consisting at least in part of oxygen, under the action of visible light; and

discontinuing oxidation when the pH of the medium has dropped to a value of 6.5–9 and at the same time at least one of the following indications is obtained:

1. the oxygen consumption resulting from the reaction exhibits a substantial decline;

2. there is a break in the continuous fall of the pH value.

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3,977,954

## SENSITIZED VAPOR PHASE PHOTO-GRAFTING OF MONOMERS ONTO SURFACES

Howard L. Needles, and Rita P. Selber, both of Davis, Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Division of Ser. No. 390,574, Aug. 22, 1973, Pat. No. 3,933,607. This application May 19, 1975, Ser. No. 578,888

Int. Cl.² C08L *1/08;* C08F *8/00*

U.S. Cl. 204—159.12 12 Claims

1. A vapor phase method for forming a graft copolymer in the presence of low energy irradiation comprising the steps of depositing a wetting agent onto the surface of a polymeric substrate selected from the group consisting of cellulose and its derivatives, protein-containing polymers, polyurethanes, vinyl polymers polyolefins, and polyesters; and contacting a vapor of an unhalogenated vinyl monomer including substituted groups selected from the group consisting of organic acids and their derivatives, organic and inorganic esters and ethers and cyanide in the presence of light energy, the majority of which comprises photons having wavelengths over 3000A, and contacting said wetted substrate with a volatile photosensitive compound from a vapor source, said photosensitive compound being capable of activation by exposure to said light to a state sufficient to create grafting sites on said polymeric substrate to thereby graft polymerize said monomer

at said sites, said wetting agent having an affinity for said polymeric substrate, monomer and photosensitive compound.

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**3,977,955**

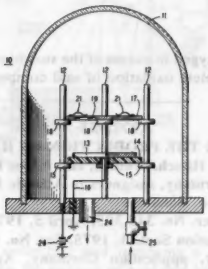
## METHOD FOR CATHODIC SPUTTERING INCLUDING SUPPRESSING TEMPERATURE RISE

**Benjamin Edward Nevis, Bethlehem, Pa., and Thomas Charles Tisone, Schaumburg, Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation-in-part of Ser. No. 468,812, May 10, 1974, abandoned. This application May 9, 1975, Ser. No. 576,015**

**Int. Cl.² C23C *15/00***

**U.S. Cl. 204—192** **2 Claims**



1. In the fabrication of semiconductor devices, the method of inhibiting the temperature rise of a semiconductor wafer comprised of an array of semiconductor devices during sputter etching of said wafer in an evacuated chamber, said semiconductor wafer having a pair of opposed major surfaces, the one of said surfaces to be etched having thereon films of inorganic dielectric material and at least one metal film, said films being susceptible to alteration at temperatures in excess of about 275°C, said chamber including, in a first portion, support means for said wafer and sputter etching means, the portions of said chamber remote from said first portion being at a lower temperature during sputter etching than said first portion, said method comprising the step of:

mounting said wafer in said support means which contact from about one-tenth to about three percent of the area of one major face of said wafer, said major surface opposite the surface to be etched being free of any proximate conductive covering whereby heat is emitted from said wafer substantially entirely by radiation.

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**3,977,956**

## CORROSION-PREVENTION SYSTEM

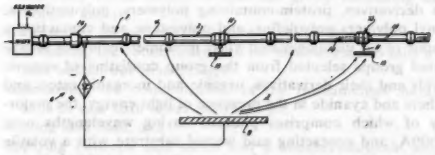
**Luigi Bagnulo, Milan, Italy, assignor to Caunned Aktiengesellschaft, Vaduz, Liechtenstein**

**Filed Apr. 28, 1975, Ser. No. 571,994**

**Claims priority, application Switzerland, May 7, 1974, 6205/74**

**Int. Cl.² C23F *13/00***

**U.S. Cl. 204—196** **7 Claims**



1. A system for protecting the exterior and the interior surfaces of a metallic conduit from the effects of corrosion, comprising an elongated metallic conduit having an exterior surface in contact with a surrounding corrosively-wet environment and an interior surface in contact with corrosive fluids conveyed within said conduit, both of said surfaces being subject to the effects of corrosion; and combined means for cathodically protecting said exterior and interior surfaces simultaneously, said combined means including means for transmitting electrical current through said corrosively-wet environment and towards said exterior surface for thereby completing a first electrolytic path therewith so as to protect said exterior surface, a plurality of inert anodes mounted at interior locations spaced along the elongation of said conduit, and cathodic plate means electrically connected with said anodes and being located exteriorly of said conduit intermediate said transmitting means and said exterior surface so as to intercept said first electrolytic path and conduct a portion of the current transmitted towards said exterior surface to said inert anodes for thereby completing a second electrolytic path through said corrosive fluids within said conduit so as to protect said interior surface thereof.

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**3,977,957**

## APPARATUS FOR INTERMITTING ELECTROPLATING STRIPS

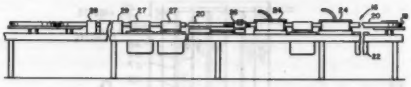
**Leo N. Kosowsky, Sharon; Curtis N. Lovejoy, Walpole, both of Mass., and John G. Cunniff, Foster, R.I., assignors to National Plastics and Plating Supply Co., Terryville, Conn.**

**Division of Ser. No. 400,153, Sept. 24, 1973, which is a division of Ser. No. 217,508, Jan. 13, 1972, Pat. No. 3,788,963. This application Sept. 4, 1974, Ser. No. 503,097**

**The portion of the term of this patent subsequent to Jan. 29, 1991, has been disclaimed.**

**Int. Cl.² C25D *17/00, 17/18, 17/28***

**U.S. Cl. 204—224 R** **2 Claims**



1. In apparatus for electroplating pre-selected portion of a continuous metallic strip and comprising

A. advancement means adapted to engage said strip and move it forward intermittently;

B. an electroplating cell adapted to clamp and seal portions of the surface of said strip to hydraulically seal portions of said strip against exposure to electroplating fluid and to hydraulically seal a plurality of other pre-selected portions of the surface to be electroplated into a conduit forming means to supply electroplating fluid to said plurality of surfaces; and

C. means to wind up said strip.

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**3,977,958**

## INSOLUBLE ELECTRODE FOR ELECTROLYSIS

**Donald Lee Caldwell, Lake Jackson, and Raymond John Fuchs, Jr., Richwood, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 425,410, Dec. 17, 1973, abandoned. This application Dec. 12, 1974, Ser. No. 531,934**

**Int. Cl.² C25B *11/04, 11/10***

**U.S. Cl. 204—252** **16 Claims**

15. In an electrolytic cell comprising a housing, a cathode, an anode, and a diaphragm, said diaphragm being interposed between said cathode and anode, the improvement wherein the anode comprises a titanium substrate having a coating of $Co_3O_4$ containing up to about 50 mole percent of zirconium oxide or vanadium oxide.

3,977,959

## ANODES FOR ELECTROLYSIS

Wolfgang Habermann, Mainz; Wolfgang Bruck, Hemsbach, and Werner Simmler, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 9, 1974, Ser. No. 504,673

Claims priority, application Germany, Sept. 13, 1973, 2346055

Int. Cl.² C25B *10/10*; C25D *17/10*

U.S. Cl. 204—290 F 9 Claims

1. An anode for electrolysis which comprises an electrically conducting member coated with an electrode material consisting essentially of

a. an alloy of tungsten with at least one metal of the iron group and

b. at least one member of the group consisting of tantalum, tantalum boride, tantalum carbide and an alloy of tantalum with at least one metal of the iron group, with the proviso that the content of a metal of the iron group in said anode is about 0.5 to less than 10% by weight with reference to the total weight of (a) and (b) and that said electrode material is doped by impregnation with a platinum metal.

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3,977,960

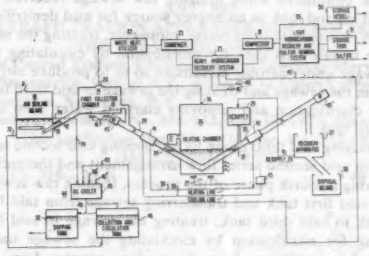
## HYDROCARBON RECOVERY SYSTEM

Vincent H. Stout, 1003 Sierra Drive, Riverton, Wyo. 82501

Filed Jan. 3, 1975, Ser. No. 538,274

Int. Cl.² C10G *1/02*; C10B *47/14*, *1/06*

U.S. Cl. 208—11 R 18 Claims



1. A method for the recovery of the vaporizable constituents of a particulate hydrocarbonaceous composite such as shale, coal and tar sands from a retort chamber in the absence of air, comprising the steps of

introducing the composite through an air seal into the retort chamber,

comingling the composite in intimate contact with a molten heat transfer material maintained at a temperature above the vaporizing temperature of the vaporizable constituents of said particulate composite,

and collecting the vaporized products above the surface of the molten heat transfer material, said step of introducing said composite through an air seal into the retort chamber further comprising the steps of

passing said composite downwardly into a sealing liquid held at a level above any exit port for said composite, and

conveying said composite upwardly from said liquid and into said retort chamber.

3,977,961

## HEAVY CRUDE CONVERSION

Glen P. Hamner, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 440,303, Feb. 7, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,314

Int. Cl.² C10G *34/00*, *13/02*; B01J *27/04*

U.S. Cl. 208—59 29 Claims

1. A process for the demetallization and conversion of the 1050°F.+ materials of a heavy metals containing hydrocarbon feed to 1050°F.− material comprising

contacting said feed in the presence of added hydrogen, with a catalyst characterized as comprising a composite of from about 5 to about 30 percent of a Group VIB metal, from about 1 to about 12 percent of a Group VIII metal, or admixture of said Group VIB and Group VIII metals, and a porous inorganic oxide support, said catalyst including a combination of properties comprising, when the catalyst is of size ranging up to 1/50 inch average particle size diameter, at least about 20 percent of its total pore volume of absolute diameter within the range of about 100A to about 200A; when the catalyst is of size ranging from about 1/50 inch up to 1/25 inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 150A to about 250A; when the catalyst is of size ranging from about 1/25 inch to about ⅛ inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 175A to about 275A; a surface area ranging at least about 200 $m^2/g$ to about 600 $m^2/g$ and a pore volume ranging from about 0.8 cc/g to about 3.0 cc/g,

at severity sufficient to convert at least about 30 percent of the 1050°F.+ material to 1050°F.− material, while removing at least about 80 percent of the heavy metals from the feed.

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3,977,962

## HEAVY CRUDE CONVERSION

William F. Arey, Jr.; Glen P. Hamner, and Willard H. Sawyer, all of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 440,285, Feb. 7, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,299

Int. Cl.² C10G *13/02*, *34/00*; B01J *27/04*

U.S. Cl. 208—59 29 Claims

1. A process for the demetallization and conversion of the 1050°F.+ materials of a heavy metals containing heavy crude or residua feed to 1050°F.− material comprising

contacting said feed, in the presence of added hydrogen with catalyst comprising a composite of a porous inorganic oxide support and an admixture of from about 0.1 to about 10 percent of a Group IVA metal, from about 5 to about 30 percent of a Group VIB metal, and from about 1 to about 12 percent of a Group VIII metal, said catalyst including a combination of properties comprising, when the catalyst is of size ranging from about 1/500 to 1/50 inch average particle size diameter, at least about 20 percent of its total pore volume of absolute diameter within the range of about 100A to about 200A; when the catalyst is of size ranging from about 1/50 inch up to 1/25 inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 150A to about 250A; when the catalyst is of size ranging from about 1/25 inch to about ⅛ inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 175A to about 275A; a surface area ranging at least abot 200 $m^2/g$ to about 600 $m^2/g$ and a pore volume ranging from about 0.8 cc/g to about 3.0 cc/g,

at severity sufficient to convert at least about 30 percent of the 1050°F.+ material to 1050°F.− material, while remov-

ing at least about 80 percent of the heavy metals from the feed.

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3,977,963

## METHOD OF NEGATING THE EFFECTS OF METALS POISONING ON CRACKING CATALYSTS

Thomas C. Readal, McCandless Township; Joel D. McKinney, Indiana, and Robert A. Titmus, Pittsburgh, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Apr. 17, 1975, Ser. No. 568,913
Int. Cl.² C10G 11/04, 9/16; C01B 29/12
U.S. Cl. 208—120 11 Claims

1. In a process which comprises contacting a hydrocarbon feed boiling above 600°F. with a cracking catalyst containing metal contaminants under cracking conditions without added hydrogen to produce a gasoline fraction; the improvement which comprises contacting said catalyst with a treating agent selected from the group consisting of bismuth, bismuth oxide, and compounds convertible to bismuth oxide so as to deposit bismuth on said catalyst, and thereafter heating the bismuth-containing catalyst to a temperature in the range of about 800° to about 1600°F.

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3,977,964

## STABILIZATION OF HYDROCRACKED LUBE OILS

Richard D. Schieman, Avon Lake, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Filed Mar. 7, 1975, Ser. No. 556,345
Int. Cl.² C10G 21/16
U.S. Cl. 208—327 5 Claims

1. A process for production of a lubricating oil which is stable in the presence of ultraviolet light which comprises extracting a hydrocracked oil-decanted oil mixture with furfural as an extractant in a contacting apparatus and recovering from the effluent from said contacting apparatus a lubricating oil having improved ultraviolet-light stability.

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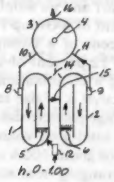
3,977,965

## METHOD OF BIOLOGICAL PURIFICATION OF SEWAGE

Bent Kure Tholander, Lyngby, and Svend Krarup, Bagsvaerd, both of Denmark, assignors to Akvadan A/S, Denmark

Continuation of Ser. No. 376,236, July 3, 1973, abandoned.
This application Jan. 27, 1975, Ser. No. 544,482
Claims priority, application Denmark, July 5, 1972, 3351/72
Int. Cl.² C02C 1/10
U.S. Cl. 210—11 3 Claims




1. A method for biologically purifying sewage utilizing a first, a second and a third treatment tank, said method comprising:

coupling said tanks in a first series flow-arrangement, in which said first tank serves as the initial tank, said second tank as the middle tank and said third tank as the final tank and, during a first phase of the process, feeding raw sewage to said first tank and transferring sewage from said first tank to said second tank and from said second tank to said third tank; during a portion of said first phase, treating the sewage in said first tank for nitrification by circulating the sewage under aerobic conditions so as to produce nitrates from the sewage and, during another portion of said first phase, treating the sewage in said first tank for denitrification by circulating the sewage under anaerobic conditions while utilizing raw sewage received by said first tank as an energy source for said denitrification, during said first phase, moreover, treating the sewage in said second tank for nitrification by circulating the sewage under aerobic conditions so as to produce nitrates from the sewage and treating the sewage in said third tank for clarification and removing clarified water from said third tank;

terminating said first phase by uncoupling said first tank from said first series flow-arrangement and, thereafter, during a second phase of the process, feeding raw sewage to said second tank and transferring sewage from said second tank to said third tank, treating the sewage in said second tank for nitrification by circulating the sewage under aerobic conditions so as to produce nitrates from the sewage, treating the sewage in said third tank for clarification and removing clarified water from said third tank, while continuing to treat the sewage in said uncoupled first tank for nitrification by circulating the sewage under aerobic conditions;

terminating said second phase by re-arranging said tanks in a second series flow-arrangement, in which said second tank serves as the initial tank, said first tank as middle tank and said third tank as the final tank and during a third phase of the process, feeding raw sewage to said second tank and transferring sewage from said second tank to said first tank and from said first tank to said third tank; during a portion of said third phase, treating the sewage in said second tank for nitrification by circulating the sewage under aerobic conditions so as to produce nitrates from the sewage and, during another portion of said third phase, treating the sewage in said second tank for denitrification by circulating the sewage under anaerobic conditions while utilizing raw sewage received by said second tank as an energy source for said denitrification, during said third phase, moreover, treating the sewage in said first tank for nitrification by circulating the sewage under aerobic conditions so as to produce nitrate from the sewage and treating the sewage in said third tank for clarification and removing clarified water from said third tank;

terminating said third phase by uncoupling said second tank from said second series flow-arrangement and thereafter, during a fourth phase of the process, feeding raw sewage to said first tank and transferring sewage from said first tank to said third tank, treating the sewage in said first tank for nitrification by circulating the sewage under aerobic conditions so as to produce nitrates from the sewage, treating the sewage in said third tank for clarification and removing clarified water from said third tank, while continuing to treat the sewage in said uncoupled second tank for nitrification by circulating the sewage under aerobic conditions;

terminating said fourth phase by rearranging said tanks in said first series flow-arrangement and repeating the method.

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3,977,966

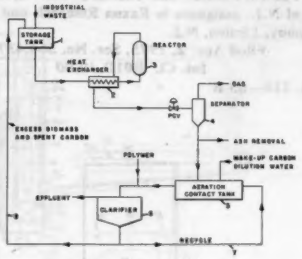
## PURIFICATION OF NON-BIODEGRADABLE INDUSTRIAL WASTEWATERS

Louis A. Pradt, Wausau, and John A. Meidl, Schofield, both of Wis., assignors to Sterling Drug Inc., New York, N.Y.

Filed Sept. 24, 1975, Ser. No. 616,496
The portion of the term of this patent subsequent to Apr. 9, 1992, has been disclaimed.
Int. Cl.² C02B 1/34; C02C 5/04
U.S. Cl. 210—17 3 Claims

1. A process for treating non-biodegradable industrial wastewaters which comprises subjecting said wastewaters to

wet oxidation at a temperature between 150° and 375°C. and a pressure between 150 and 4000 psig so that a reduction of between 30 and 99 percent in chemical oxygen demand is obtained, separating the gaseous, liquid and solid phases from said oxidation, biologically oxidizing the liquid phase in an aeration contact tank containing a biomass suitable to effect biological oxidation of the organic solutes present in said liquid phase while maintaining powdered activated carbon in the aeration contact tank in an amount sufficient to enhance




the bio-oxidation and substantially reduce the odor and color of said liquid phase, carrying out the biological oxidation until excess biomass builds up and the activated carbon becomes spent, transferring a mixture of the excess biomass and spent carbon to a wet oxidation reactor, and oxidizing said mixture under conditions similar to those used for the wet oxidation of the non-biodegradable industrial wastewater so as to regenerate the powdered activated carbon for further use in the biological oxidation step and at the same time disposing of the excess biomass.

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**3,977,967**

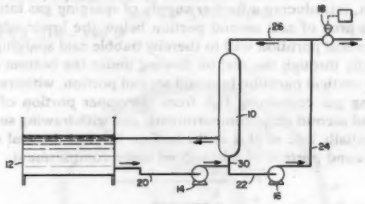
## ULTRAFILTRATION APPARATUS AND PROCESS FOR THE TREATMENT OF LIQUIDS

**Olof Conrad Trulson, Chappaqua, and Lawrence Marvin Litz, Pleasantville, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Continuation of Ser. No. 358,943, May 10, 1973, abandoned. This application Dec. 13, 1974, Ser. No. 532,683**

**Int. Cl.² B01D** *13/00*

**U.S. Cl. 210—23 F** **48 Claims**




**1.** An ultrafiltration apparatus having improved resistance to clogging for the concentration and separation of components contained in liquids, said apparatus comprised of, in combination:

a. at least one module having
   i. at least one entrance port,
   ii. at least one exit port,
   iii. a permeate collection zone, having at least one exit port,
   iv. a multiplicity of axially aligned hollow tubular members disposed in said zone in close proximity to one another, said members having a pore volume of at least about 0.08 cc/gm in the distribution peak in the pore diameter range wherein the majority of the pores are from about 0.1 to about 2.0 microns in diameter, said members being supported and sealably mounted in said zone so that liquid entering said module must contact said members and any components of said liquid which permeate the walls of said members collect in said permeate collection zone, and
   v. contained on the surface of said members which is in direct contact with said liquid a substantially uniform continuous adherent porous coating of preformed aggregates of metal oxide particles, said aggregates of particles having an average mean size of less than 5.0 microns, said coating being from about 0.01 to about 10.0 microns in thickness without substantial penetration into said members,
b. means for supplying a feed liquid to said module,
c. means for withdrawing a concentrated liquid from said module, and
d. means for withdrawing a permeate liquid from said permeate collection zone.

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**3,977,968**

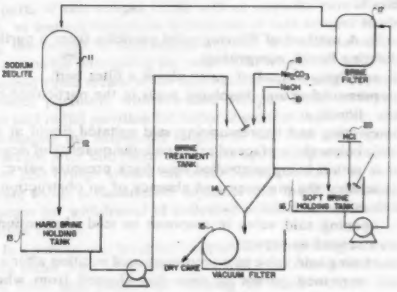
## ION EXCHANGE REGENERATION

**Karsten Odland, La Grange Park, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.**

**Continuation-in-part of Ser. No. 350,879, April 13, 1973, abandoned. This application June 19, 1975, Ser. No. 588,437**

**Int. Cl.² B01D** *15/06*

**U.S. Cl. 210—32** **8 Claims**




**1.** A process for the regeneration of a column of an exhausted sodium zeolite softener which comprises feeding an excess of substantially pure soft sodium chloride brine at a concentration of about 8–12% as input regenerating liquid to said zeolite column and removing from said zeolite column a hard brine containing substantial amounts of alkaline earth metal values, adjusting the total volume of regenerative liquid passing through said zeolite column so that the alkaline earth metal values calculated as $CaCO_3$ have a maximum value of about 16,000 ppm so as to avoid the formation of a gelatinous product and further precipitating the alkaline earth metals by utilization of sodium carbonate and sodium hydroxide, removing the calcium and magnesium precipitates formed and adjusting the pH of the so-treated liquid to below 8.0 with HCl to produce a softened brine suitable for recycle as the regenerating liquid.

3,977,969

## CONTAINMENT AND RIDDANCE OF OIL SPILLS

David M. Zall, Annapolis, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 26, 1971, Ser. No. 192,305
Int. Cl.² B01D *15/06*; C02B *1/14*
U.S. Cl. 210—40 4 Claims

1. A method of removing oil spills from water which comprises:

treating the oil spill with a high molecular weight polymer selected from the group consisting of the polymer of polyethylene-oxide and the polymer of polyacrylamide; and skimming off the coagulated oil from the water.

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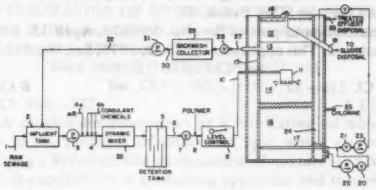
3,977,970

## APPARATUS FOR AND METHOD OF FILTERING SOLID PARTICLES FROM A PARTICULATE-BEARING LIQUID

Roderick M. Willis, and Charles L. Oldfather, both of Seattle, Wash., assignors to Keystone Engineering & Products Co. Inc., Seattle, Wash.

Filed Dec. 23, 1974, Ser. No. 536,974
Int. Cl.² B01D *23/16*
U.S. Cl. 210—44 3 Claims




1. A method of filtering solid particles from a particulate-bearing liquid, comprising:

supplying a head of water above a filter bed;

pressurizing and dissolving a gas in the particulate-bearing liquid;

ejecting and depressurizing said agitated liquid at a point below the surface of said head, the quantity of depressurization being controlled by a back pressure valve;

sensing the presence and absence of an obstruction within said valve;

opening said valve in response to said obstruction being sensed as present;

closing said valve to a predetermined position after a predetermined period of time has elapsed from when said obstruction has been sensed as absent;

removing said froth from the surface of said head; and

withdrawing filtered water from a filtered water discharge port beneath said filter bed, thereby causing water to flow through said filter bed.

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3,977,971

## METHOD OF FEEDING POLYMERS

John E. Quinn, Doylestown, and Joseph I. Gerstemeier, Phoenixville, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Dec. 3, 1974, Ser. No. 529,209
Int. Cl.² B01D *21/01*
U.S. Cl. 210—49 11 Claims

1. A method of feeding a water-soluble polymeric flocculant having a molecular weight of from about 800,000 to about 20,000,000 to an aqueous medium having solid matter dispersed and suspended therein, which medium is being pumped and therefore undergoing a turbulent shearing action, which method comprises adding an effective amount of said polymeric flocculent as discrete particles having an effective size range to achieve dissolution in said aqueous medium, to reduce the effect of said turbulent shearing action on the molecular weight and flocculating activity of said polymeric flocculant after said polymeric flocculant dissolves in said aqueous medium.

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3,977,972

## METHOD AND APPARATUS FOR RECLAIMING CONTAMINATED LIQUID

Heinz P. Bloch, Chester, and Charles J. Colwell, Bernardsville, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 2, 1975, Ser. No. 564,437
Int. Cl.² B01D *19/00*
U.S. Cl. 210—63 R 7 Claims

1. A high efficiency method of removing $H_2S$ from contaminated seal oil comprising the steps of introducing said contaminated seal oil into a lower portion of a first stage compartment, introducing either gaseous nitrogen or air sparging gas into a lower portion of said compartment throughout a major portion of its bottom surface, allowing the seal oil to overflow from the top of said first stage compartment into the top of a first portion of a second stage compartment, said second stage compartment having a vertical partition wall therein extending above the surface level of the seal oil therein and terminating at its lower edge adjacent the bottom surface of said second stage compartment to divide said compartment into a first portion and a second portion and define a passageway for the flow of seal oil therebetween, introducing additional sparging gas across substantially the initial bottom portion of said first portion of the second stage compartment to thereby bubble said sparging gas upwardly through said first portion countercurrent to the downward flow of seal oil through said first portion, introducing a further supply of sparging gas into the bottom area of said second portion below the lower edge of said vertical partition wall to thereby bubble said sparging gas upwardly through the seal oil flowing under the bottom edge of said vertical partition into said second portion, withdrawing sparging gas containing $H_2S$ from the upper portion of said first and second stage compartments, and withdrawing seal oil substantially free of $H_2S$ at the surface level of the seal oil in said second portion of said second stage compartment.

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3,977,973

## FRY KETTLE WITH INTEGRAL CONTINUOUS FILTER

Lyle V. Anderson, 122 Carriage Drive, Pittsburgh, Pa. 15237

Filed Apr. 28, 1975, Ser. No. 572,016
Int. Cl.² B01D *35/00*, *37/02*
U.S. Cl. 210—167 18 Claims

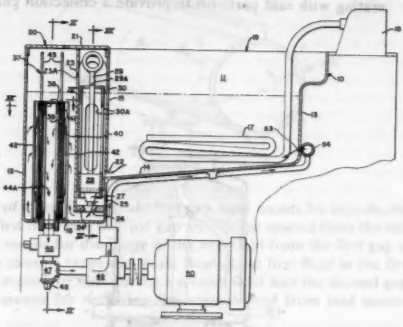
12. A deep-fat fryer with an integral filter system comprising the combination of:

a kettle including side walls joined with a vertically-arranged internal crosswall having at least one passageway at the floor of the kettle to conduct a fluid medium from a cooking compartment lying at one side of said crosswall into a filter compartment lying at the other side of said crosswall, the filter compartment having a drain port in the wall of said kettle for discharging fluid medium

after filtering thereof and the cooking compartment having a charge port in the wall of the kettle to receive the fluid medium after filtering thereof,

a vertical wall dividing said filter compartment into a first and second interconnected filter compartment parts lying at opposite sides of said vertical wall within said kettle,

said first filter compartment containing a crumb catcher having a wall with perforated openings extending between said internal crosswall and said vertical wall dividing said filter compartment,



said second filter compartment containing a porous filter means including a filter cloth to entrain a filter powder compound when admixed with the fluid medium to clean and purify the fluid medium passed thereto from the first filter compartment part,

a support frame carrying said porous filter means within the second filter compartment part in a manner to pass only cleaned and purified liquid medium into said drain port, and

pump means coupled by conduit means with said drain port and said charge port for feeding the cleaned and purified fluid medium into said storage compartment.

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**3,977,974**

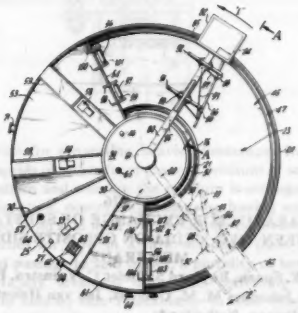
## SUSPENDED SLUDGE SCRAPER FOR ARCUATE SEDIMENTATION ZONE

**John Franklin Pelton, Yorktown Heights, N.Y., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed Oct. 6, 1975, Ser. No. 620,037**

**Int. Cl.² C02C *1/08***

**U.S. Cl. 210—195 S** **16 Claims**



1. In a liquid treatment apparatus comprising a circular tank outer wall; a circular inner wall concentric with said outer wall forming an intermediate volume between said inner and outer walls; a first radial partition extending across said intermediate volume between and joined at opposite edges to said inner and outer walls; a second radial partition extending across said intermediate volume and joined at opposite edges to said inner and outer walls, being spaced from said first radial partition to as to form arcuate sedimentation zone in said intermediate volume bounded by segments of said inner and outer walls; means for introducing and distributing feed liquid - solid in said arcuate sedimentation zone for sedimentation therein to form a solids-depleted liquid in the upper part of said zone and a layer of settled solids in the bottom part thereof; means for discharging solids-depleted liquid from said upper part of said sedimentation zone; the improvement of means for collecting and removing settled solids from said bottom part of said sedimentation zone comprising: a solids collection trough extending around one of said inner and outer wall segments at the bottom of said sedimentation zone; a bridge extending radially across and above said sedimentation zone; mechanical drive means for moving said bridge in an arcuate path reciprocatingly and repetitively around said arcuate sedimentation zone between said first and second radial partitions; a scraper blade extending transversely across said sedimentation zone at the bottom thereof and having one end adjacent said solids collection trough; first cable means joining an inner part of said bridge and an inner part of said scraper blade and second cable means joining an outer part of said bridge and an outer part of said scraper blade, for drawing said scraper blade in an arcuate path around said arcuate sedimentation zone in trailing relationship to the points of attachment of said first and second cable means to said bridge, said cable means nearer said solids collection trough being longer in length than the other said cable means such that said scraper blade is disposed at an acute angle with respect to said radialy extending bridge during movement of said bridge around said sedimentation zone, whereby said solids settled in the bottom part of said sedimentation zone are collected and transferred by said blade to said solids collection trough during said drawing of said blade around said sedimentation zone in both directions of movement; third cable means joining one of said inner and outer parts of said scraper blade with an opposite part of said bridge, to restrict transverse movement of said scraper blade during movement of said bridge around said sedimentation zone; means for shortening the suspended lengths of said first and second cable means at the approach of said bridge to each said radial partition, whereby said scraper blade is drawn toward said radial partition for radial alignment therewith, and for increasing the suspended lengths of said first and second cable means after said radial alignment upon reciprocal movement of said bridge toward the other radial partition, so as to eliminate solids accumulation adjacent said radial partitions; and means for withdrawal of collected solids from said solids collection trough.

13. In a wastewater treatment apparatus comprising a circular tank outer wall; a circular inner wall concentric with and spaced from said outer wall forming an inner volume and intermediate volume between said inner and outer walls, such that the ratio of the inner wall radius ($R_1$) to the outer wall radius ($R_2$) is between 0.25 and 0.70; a first radial partition extending across said intermediate volume between and joined at opposite edges to said inner and outer walls; a second radial partition extending across said intermediate volume between and joined at opposite edges to said inner and outer walls, being spaced from said first radial partition so as to form a first arcuate portion sedimentation zone in said intermediate volume bounded by segments of said inner and outer walls comprising between 90° and 330° of their respective circumferences and a second arcuate portion comprising the remainder of said intermediate volume; first fluid mixing and recirculation means within said outer wall in a first part other than said first arcuate portion and a cover enclosing said first part positioned over said first fluid mixing and recirculation means to form a first aeration zone; first passage means for introducing oxygen gas in said first aeration zone; second passage means for introducing feed wastewater and thickened activated sludge to said first aeration zone; second fluid mixing and recirculation means within said outer wall in a second part

other than said first arcuate portion and a second cover enclosing said second part positioned over said second fluid mixing and recirculation means to form a second aeration zone; first gas interzone transfer means spaced from said first passage means for discharging oxygen-depleted gas from said first aeration zone and introducing same to said second aeration zone as the oxygen-containing gas therefor; first liquor interzone transfer means for discharging first oxygenated liquor from said first aeration zone and introducing same to said second aeration zone for mixing therein with said oxygen-containing gas; gas vent means spaced from said first gas interzone transfer means for discharging oxygen-further depleted gas from said second aeration zone; liquor passage means for discharging second oxygenated liquor from said second aeration zone; means for uniformly distributing oxygenated liquor in said first arcuate portion sedimentation zone in said intermediate volume around the inner wall segment for radial flow across said first arcuate portion sedimentation zone for both clarification of said liquor and thickening of activated sludge therein; trough means around the upper part of said outer wall segment of said first arcuate portion sedimentation zone for discharging clarified water therefrom; the improvement of means for collecting and removing settled thickened activated sludge from the bottom part of said first arcuate portion sedimentation zone comprising: a sludge collection trough extending around said inner wall segment at the bottom of said sedimentation zone; a bridge extending radially across and above said sedimentation zone; mechanical drive means for moving said bridge in an arcuate path reciprocatingly and repetitively around said arcuate sedimentation zone between said first and second radial partitions; a scraper blade extending transversely across said sedimentation zone at the bottom thereof and having one end adjacent said sludge collection trough; first cable means joining an inner part of said bridge and an inner part of said scraper blade and second cable means joining an outer part of said bridge and an outer part of said scraper blade, for drawing said scraper blade in an arcuate path around said arcuate sedimentation zone in trailing relationship to the points of attachment of said first and second cable means to said bridge, said first cable means being longer in length than said second cable means such that said scraper blade is disposed at an acute angle with respect to said radially extending bridge during movement of said bridge around said sedimentation zone, whereby said sludge solids settled in the bottom part of said sedimentation zone are collected and transferred by said blade to said sludge collection trough during said drawing of said blade around said sedimentation zone in both directions of movement; third cable means joining said part of said scraper blade nearer said sludge collection trough with an opposite part of said bridge, to restrict transverse movement of said scraper blade during movement of said bridge around said sedimentation zone; means for shortening the suspended lengths of said first and second cable means at the approach of said bridge to each said radial partition, whereby said scraper blade is drawn toward said radial partition for radial alignment therewith, and for increasing the suspended lengths of said first and second cable means after said radial alignment upon reciprocal movement of said bridge toward the other radial partition, so as to eliminate sludge solids accumulation adjacent said radial partitions; and means for withdrawal of collected sludge solids from said sludge collection trough.

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3,977,975

## APPARATUSES FOR THE SEPARATION OF MIXTURES OF LIQUIDS OF DIFFERENT GRAVITIES, E.G. OIL AND WATER

Alfonsus Antonius Geurtsen, Schalkhaar, Netherlands, assignor to Machinefabrick Geurtsen Deventer, B.V., Deventer, Netherlands

Filed Nov. 20, 1974, Ser. No. 525,518

Claims priority, application Netherlands, Dec. 14, 1973, 7317147

Int. Cl.[2] B01D *35/14*

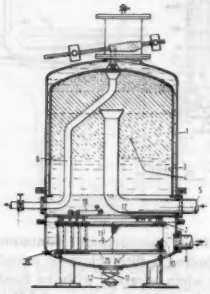
U.S. Cl. 210—315 4 Claims

1. Apparatus for separating a mixture of immiscible liquids of different specific gravities, comprising in combination:

a closed vessel having a substantially horizontal partition defining upper and lower chambers above and below said partition, said partition having a substantially central opening which communicates the two chambers;

a supply conduit having an outlet discharging said mixture into said upper chamber at a region below the top of the vessel, and a discharge conduit having an inlet disposed above said outlet of the supply conduit whereby to remove the lighter liquid which collects by gravity separation at the uppermost region of said upper chamber;

a filter assembly disposed in said lower chamber and cooperating with said partition to provide a collection cham-



ber which surrounds said filter assembly to collect substantially only the heavier liquid, there being a second discharge conduit having an inlet in said collection chamber whereby to discharge heavier liquid from the vessel, said filter assembly comprising at least one pair of radially spaced, tubular filter elements disposed concentrically of said opening to define an intermediate chamber therebetween; and

at least one tapping passage for leading lighter liquid from the uppermost region of said intermediate chamber directly into the lowermost region of said upper chamber, and a valve member associated with said tapping passage for opening and closing same.

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3,977,976

## APPARATUS FOR EXCHANGE OF SUBSTANCES BETWEEN TWO MEDIA ON OPPOSITE SIDES OF A MEMBRANE

Josef A. E. Spaan, Buyaard 5; Pieter C. Veenstra, Pelikaanlaan 1, and Johannes M. M. Oomens, Jan van Helustraat 14, all of Eindhoven, Netherlands

Filed Aug. 5, 1974, Ser. No. 494,884

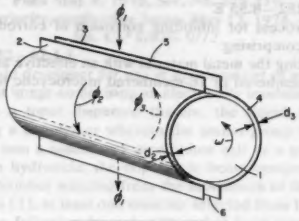
Claims priority, application Netherlands, Aug. 5, 1973, 7310808

Int. Cl.[2] B01D *31/00*

U.S. Cl. 210—321 B 12 Claims

1. An apparatus for the exchange of substances between two fluids separated by a membrane, comprising a housing, a

fluid-impervious member rotatably disposed coaxially in the housing with its peripheral surface in spaced relationship therewith, a membrane tautly disposed about the said member and adapted to form a first annular gap between the membrane and the rotatable member and a second annular gap between the housing and membrane in response to tangential



flow of a first fluid in said first gap, inlet means for introducing the first fluid into the first gap and means spaced from the said inlet means for discharge of the first fluid from the first gap so as to cause a tangential main flow of the first fluid in the first gap, means for introducing a second fluid into the second gap, and means for removing the second fluid from said second gap.

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**3,977,977**

## SEPARATING DEVICE

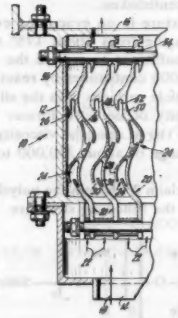
**Horst Kall, Gummersbach, Germany, assignor to L. & C. Steinmuller GmbH, Germany**

**Continuation-in-part of Ser. No. 408,067, Oct. 19, 1973, abandoned. This application Feb. 6, 1975, Ser. No. 547,491**

**Claims priority, application Germany, Oct. 19, 1972, 2251173**

**Int. Cl.² B01D *43/00, 45/04***

**U.S. Cl. 210—521** **5 Claims**



1. A device for separating heavier substances from fluids including liquids or solids from gaseous medium or solids from a liquid medium and wherein the medium is arranged to flow in a flow direction, comprising a housing having an inlet, an outlet spaced from said inlet with a passage between said inlet and said outlet for flow in a flow direction from said inlet through said passage to said outlet, a plurality of horizontally spaced vertically arranged undulated deflecting elements positioned in side-by-side relationship in said flow passage parallel to the flow direction, said deflecting elements each having a plurality of alternating waves and valleys with each wave having an apex and including a plurality of separation chambers defining individual gullies for separating heavier substances from the fluid spaced along the length of each of said deflecting elements on at least one side thereof and including at least one first gully arranged at an apex of one of said waves of said undulated deflecting elements, said gully being defined by a rear gully wall formed by a wall portion of said deflecting element, a downstream wall curved outwardly in an upstream direction from said rear gully wall to form an apex on its exterior and a curved deflection wall on its interior and an upstream wall having the curvature of said deflecting elements extending in a downstream direction outwardly from said rear wall at a location upstream of said downstream wall toward said downstream wall and inwardly of the downstream wall, said downstream wall having a portion overlapping a portion of said upstream wall and being spaced from said upstream wall to define the first gully entrance therebetween, said downstream wall projecting outwardly into the fluid flow and entraining the fluid to flow through said gully entrance so that said deflection wall on its interior deflects the flow into a circular path and imparts a whirling flow to the fluid as it moves into said gully, the whirling flow causing centrifugal separation of the heavier particles in the fluid flow, said deflecting elements including at least one second gully at another apex of said deflecting elements downstream from said first gully and having spaced-apart upstream and downstream parallel boundary walls defining an entrance therebetween larger than said first gully entrance and defining a second gully therebetween extending parallel to the flow direction so as to entrain larger size particles therein which are not entrained by said first gully, said boundary wall interior bordering said second gully being parallel to the flow direction.

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**3,977,978**

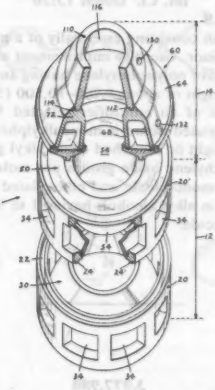
## SEPARATION CHAMBER, HOLDING TANK, DRAINAGE SYSTEM

**Robert M. Purcell, 22 Ronald Lane, Sayville, N.Y. 11782**

**Filed Feb. 3, 1975, Ser. No. 546,402**

**Int. Cl.² B01D *21/00***

**U.S. Cl. 210—521** **13 Claims**



1. A combined separation chamber holding tank and drainage system comprising:

a. at least one drainage ring of predetermined height and circumferential configuration;

b. at least one drainage ring aperture extending through said drainage ring;

c. a holding tank assembly of predetermined height and having a circumferential configuration proximating that of said drainage ring;

d. said holding tank assembly further being formed so as to be readily positioned upon said drainage ring and so that once so positioned it forms a closed top for said drainage ring;

e. said holding tank assembly further being formed to provide closed receptacle means;

f. at least one annular separation chamber of predetermined height and having a circumferential configuration proximating that of said holding tank assembly and drainage ring;

g. said separation chamber further being formed so as to be readily positioned upon said holding tank assembly and so that as to have an outer wall and an inner wall both of said circumferential configuration and spaced one from the other to form therebetween a chamber;

h. said inner wall of said chamber and said closed receptacle means of said holding tank assembly forming a sewage receiving receptacle;

i. a plurality of dividers disposed in spaced relationship one from the other in said chamber to divide same into sections, said dividers spanning said inner wall and said outer walls of said separation chamber but being shorter in height than said predetermined height of said separation chamber; and

j. conduit aperture means leading into said sewage receiving receptacle from said sewage receiving receptacle into said separation chamber and from said separation chamber into said drainage ring aperture.

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3,977,979

## YARN FINISH FORMULATIONS

Roger John Crossfield, Matthews, and Norman Robert Cohen, Charlotte, both of N.C., assignors to George A. Goulston Company, Inc., Monroe, N.C.

Filed Sept. 14, 1973, Ser. No. 397,338
Int. Cl.[2] D06M *15/26*
U.S. Cl. 252—8.8 5 Claims

1. A yarn finish consisting essentially of a major amount of mineral oil, a minor, viscosity improvement amount of about 0.1 to 15 percent of polyisobutylene having an average viscosity molecular weight of about 8,700–10,500 (Staudinger) and a minor amount of an emulsifier selected from the group consisting ethoxylated isomeric monoalkylphenols substituted with $C_3$–$C_{18}$ straight or branched chain alkyl groups and containing 1 to 9 ethylene oxide groups per molecule, polyethylene glycol 100 mono-oleate and ethoxylated $C_6$–$C_{18}$ straight or branched chain alkyl alcohols having 1 to 9 ethylene oxide groups per molecule.

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3,977,980

## SOLID FABRIC CONDITIONER COMPOSITION

Franklin Hornor Fry, Huntington Beach, Calif.; Orville Reinke, Oshkosh, Wis.; Wayne A. Marthaler, Ridgefield, Conn.; Richard K. Wylie, and Frederick C. Boye, both of Appleton, Wis., assignors to American Can Company, Greenwich, Conn.

Filed Jan. 4, 1974, Ser. No. 430,651
Int. Cl.[2] D06M *13/36*
U.S. Cl. 252—8.8 8 Claims

1. A fabric conditioner composition consisting essentially of a conditioning agent in admixture with diatomaceous earth, said mixture being in solid, compressed form, containing from about 70 to about 45% conditioner and from about 30 to about 55% diatomaceous earth, and exhibiting a compressive strength of from about 8 to about 26 pounds per square inch.

3,977,981

## INHIBITING CORROSION WITH MACROCYCLIC TETRAMINE CORROSION INHIBITORS

Arthur K. Dunlop, Houston, Tex., and Janis Vasilevskis, West Caldwell, N.J., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 14, 1975, Ser. No. 632,035
Int. Cl.[2] C09K *7/02*; C23F *11/00*; C07D *257/00*
U.S. Cl. 252—8.55 E 6 Claims

1. A process for inhibiting corrosion of corrodible metal material comprising:

contacting the metal material with an effective amount of a 14-membered or 16-membered macrocyclic tetramine.

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3,977,982

## CONTROLLING VISCOSITY OF SILICA-SILICONE OIL GELS

William Hertl, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,488
Int. Cl.[2] C09K *3/00*
U.S. Cl. 252—60 5 Claims

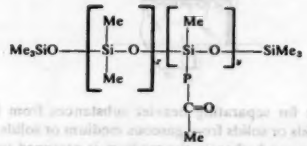
1. A method of preparing a thixotropic gel-like material useful as a partitioning substance between the serum and clot portions of blood, the method comprising the steps of:

a. preparing a mixture of a silicone fluid and silica particles to form a gel-like composition having a specific gravity in the range of about 1.030 to 1.090 and a viscosity above about 200,000 centistokes;

b. reacting the mixture in an evacuated environment at a temperature ranging from about 175° to 550°C. for a period of time sufficient to reduce the viscosity to less than about 120,000 centistokes by reaction of a portion of the silica particle surfaces with the silicone fluid; and

c. adding a quantity of network former to the reaction products of step (b) to raise the viscosity of the reaction products to a range of about 200,000 to about 600,000 centistokes.

3. The method of claim 2 wherein the polysiloxane-polyoxyalkyl copolymer has the following structure




where the monomeric units are randomly distributed and

Me represents $-CH_3$;

$x$ represents a number between 80 and 120;

$y$ represents a number between 8 and 12;

P represents a polyoxyalkyl side chain represented by the formula

$$-(CH_2-CH_2-O)_m-(CH_2-CH_2-CH_2-O)_n-$$

where the monomeric units are randomly distributed and

$m$ represents a number between 20 and 30; and

$n$ represents a number between 1 and 30.

3,977,983

# LIQUID DEVELOPER FOR USE IN DEVELOPMENT OF AN ELECTROSTATIC LATENT IMAGE COMPRISING A COPOLYMER CONTAINING AN AMINO GROUP CONVERTED INTO A QUATERNARY AMMONIUM SALT OR HYDROXIDE

**Terukuni Tsuneda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 8, 1975, Ser. No. 575,719**

**Claims priority, application Japan, May 17, 1974, 49-55743**

**Int. Cl.² G03G 9/12**

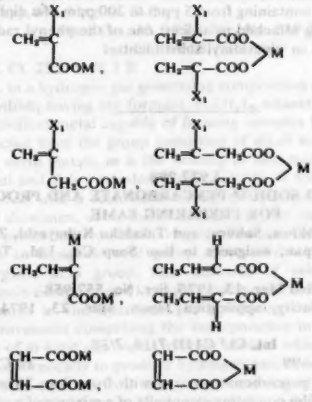
**U.S. Cl. 252—62.1 L** **8 Claims**

**1. A liquid developer for use in development of an electrostatic latent image comprising an electrically insulating carrier liquid and a toner dispersed therein, the liquid developer comprising a copolymer wherein the amino group thereof is converted into a quaternary ammonium salt or a quaternary ammonium hydroxide, the copolymer being composed of at least one member selected from the monomers of the following formula (1), at least one member selected from the monomers of the following formula (2) and at least one member selected from the monomers of the following formula (3),**

**Formula (1):**

**wherein X is selected from the class of —H and —$CH_3$ and $Y_1$ is selected from the class of —$C_nH_{2n+1}$, —$OC_nH_{2n+1}$ and —$COOC_nH_{2n+1}$ in which $n$ is from 8 to 20, wherein the monomer of formula (1) is present in a mole ratio sufficient to prevent a decrease in the solubility of the copolymer in said carrier liquid;**

**Formula (2):**

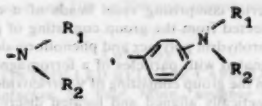


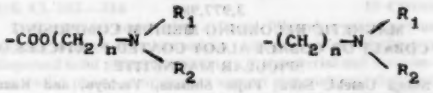
**wherein $X_1$ is selected from the class of —H, —$CH_3$ and —COOM and M is selected from the class of an alkali metal and alkaline earth metal.**

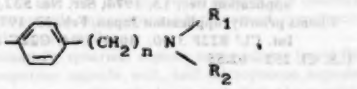
**Formula (3):**

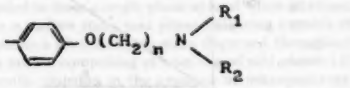


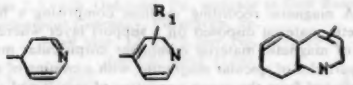
**wherein X is selected from the class of —H and —$CH_3$ and $Y_2$ is selected from the class of the following substituents:**

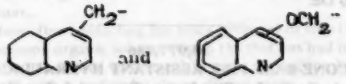












**wherein $1 \leq n \leq 4$; $R_1$ and $R_2$ are similar or dissimilar, selected from the class of —H and —$C_mH_{2m+1}$; and $1 \leq m \leq 4$.**

3,977,984

## CHEMICALLY REACTIVE RESIN BEADS AND TO METHODS OF THEIR MANUFACTURE

Roy Roberts, Lindfield, Australia, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 128,139, March 25, 1971, abandoned. This application Oct. 23, 1975, Ser. No. 625,186
Claims priority, application Australia, Apr. 8, 1970, 0849/70
Int. Cl.² C04B *35/04*; H01F *1/26*
U.S. Cl. 252—62.54 2 Claims

1. A material comprising resin beads of a condensation polymers selected from the group consisting of polyethylenimine-epichlorohydrin polymer and phenolformaldehyde polymers impregnated with particles of a ferromagnetic material selected from the group consisting of γ-ferricoxide and barium ferrite, magnetically aligned and located discretely with respect to each other when the polymer has a molecular weight between 1000 and 10,000.

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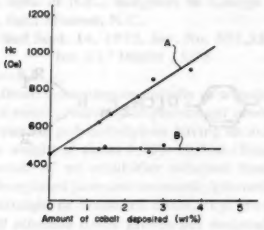
3,977,985

## MAGNETIC RECORDING MEDIUM COMPRISING COBALT OR COBALT ALLOY COATED PARTICLES OF SPICULAR MAGNETITE

Shinji Umeki, Saku; Fujio Shibata, Yachiyo, and Kazuo Takada, Ohmiya, all of Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Division of Ser. No. 501,827, Aug. 29, 1974, which is a division of Ser. No. 334,59£, Feb. 22, 1973, abandoned. This application Dec. 13, 1974, Ser. No. 532,681
Claims priority, application Japan, Feb. 23, 1972, 47-18627
Int. Cl.² B22F *3/00*; H01F *1/04*; C22C *1/04*
U.S. Cl. 252—62.55 6 Claims




1. A magnetic recording medium comprising a layer of magnetic material disposed on a support layer wherein said layer of magnetic material comprises corpuscular magnetic core particles of spicular magnetite, with a coating of a material selected from the group consisting of cobalt and an alloy of cobalt wherein the amount of cobalt in said coating is in the range of from 4 to 10 wt% and is formed by heating a deposit selected from said group, said layered particles being heat treated to a temperature greater than 100°C, to effect said layered particles having a coercive force in the range of 490 to 900 Oe.

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3,977,986

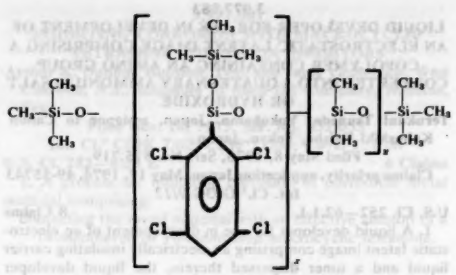
## SILICONE-BASE FIRE RESISTANT HYDRAULIC FLUID

Alfeo A. Conte, Jr., Warrington, Pa., and J. Lee Hammond, Pitman, N.J., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 2, 1975, Ser. No. 583,310
Int. Cl.² C10M *3/44*
U.S. Cl. 252—78.3 3 Claims

1. A silicone base fluid having improved lubricity characteristics comprising:

a major amount of a tetrachlorophenylmethyl silicone fluid defined by the formula



wherein the tetrachlorophenyl siloxane and the dimethyl siloxane moieties are present in amounts of 12.5 and 87.5 weight percents, respectively;

an amount in the range of from 0.1 to 0.4 percent by weight of 2,5-bis-alkyl-dithio-1,3,4 thiadiazole; and

an amount in the range of from 1.0 to 3.0 percent by weight of dibutylchlorendate.

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3,977,987

## FUEL AND LUBRICANT COMPOSITIONS CONTAINING NOVEL PYRROLIDINYL OR PIPERIDINYL-SUBSTITUTED DIPHENYL ALKANE ANTIOXIDANTS

Paul A. Pinke, Des Plaines, and Stephen N. Massie, Palatine, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 339,818, March 9, 1973, Pat. No. 3,853,887. This application Nov. 4, 1975, Ser. No. 520,579
Int. Cl.² C10M *1/32*
U.S. Cl. 252—50 12 Claims

1. A petroleum distillate selected from the group consisting of gasoline, fuel oil, diesel oil, kerosene and lubricating oil, said distillate containing from 5 ppm to 200 ppm of a diphenylalkane having attached to at least one of the phenyl radicals a pyrrolidinyl or piperidinyl substituent.

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## STABILIZED SODIUM PERCARBONATE AND PROCESS FOR PREPARING SAME

Fumikatsu Tokiwa, Sakura, and Takehiko Kobayashi, Zushi, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Mar. 13, 1975, Ser. No. 557,958
Claims priority, application Japan, Mar. 23, 1974, 49-32903
Int. Cl.² C11D *7/18*, *7/38*
U.S. Cl. 252—99 10 Claims

1. Sodium percarbonate coated with from 3 to 20 weight percent of a film consisting essentially of a mixture of a silicate and a silicofluoride, wherein the weight ratio of silicate : silicofluoride is in the range of 1:1 to 10:1, and

wherein said silicate is selected from the group consisting of alkali metal silicates and alkaline earth metal silicates, and wherein said silicofluoride is selected from the group consisting of alkali metal silicofluorides and alkaline earth metal silicofluorides.

3,977,989

## TRIETHANOLAMINE METHYLENEDIANILINE CURING AGENT AND THE PROCESS FOR USING SAME IN THE MANUFACTURE OF HIGH RESILIENT COLD MOLDED FOAM

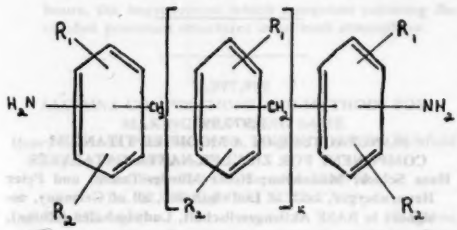
**Bernard Taub, Williamsville, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.**

**Division of Ser. No. 314,048, Dec. 11, 1972, Pat. No. 3,816,360. This application Jan. 28, 1974, Ser. No. 437,419**

**Int. Cl.² C08G** *18/18;* **C08K** *5/16*

**U.S. Cl. 252—182** **6 Claims**

1. A curing agent composition for polyurethane foam comprising an aromatic diamine wherein each amine group is attached to a different carbon atom of the same or different hydrocarbon aromatic ring which aromatic diamine may also contain on the aromatic ring halogen or lower alkyl substituents, sufficient triethanolamine to prevent gel formation in the polyurethane before foaming of the polyurethane is complete and a sufficient amount of an aromatic polyamine mixture of at least two compounds each having the general formula:



3,977,990

## CONTROLLED GENERATION OF COOL HYDROGEN FROM SOLID MIXTURES

**Werner F. Beckert, Las Vegas, Nev.; William H. Barber, Brandywine, Md.; Ottmar H. Dengel, Front Royal, Va., and Robert A. Robb, Bryans Road, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 30, 1974, Ser. No. 519,312**

**Int. Cl.² C01B** *1/02, 1/05*

**U.S. Cl. 252—188.3 R** **19 Claims**

1. In a hydrogen gas generating composition comprising (1) a hydride having the formula $Y(ZH_4)_m$ wherein Y is a mono- or divalent metal capable of forming complex hydrides and is selected from the group consisting of alkali metals and alkaline earth metals, *m* is the valency of said mono- or divalent metal and Z is a trivalent metal capable of forming complex hydrides and is selected from the group consisting of boron and aluminum, or mixtures of said hydrides; and (2) a hydrogen producing reactant having the formula $(NH_4)_nX$ wherein X is an inorganic acid group and *n* is the valency of said inorganic acid group, and mixtures of said compounds, wherein components (1) and (2) are present in stoichiometric amounts in the hydrogen gas generating composition, the improvement comprising the incorporation in said composition of at least one metal hydride coolant which decomposes endothermically to produce hydrogen gas; and a reaction rate modifier selected from the group consisting of the acetylacetonates of barium, calcium, chromium, cobalt (II), copper (II), iron (II), iron (III), manganese (III), nickel, vanadium, and zinc; molybdenyl (VI) acetylacetonate; uranyl acetylacetonate; vanadyl acetylacetonate; ferric oxide; platinum dioxide; silicon dioxide; silver oxide; palladium metal powder; silver carbonate; lanthanum chloranilate; nickel benzoylacetonate; cuprous oxide; palladium chloride; and mixtures thereof.

3,977,991

## MANGANESE-AND-MAGNESIUM-ACTIVATED STRONTIUM SULFIDE PHOSPHORS

**Arthur Leo Smith, Lancaster, and Donnavon David Shaffer, Lititz, both of Pa., assignors to RCA Corporation, New York, N.Y.**

**Filed Feb. 24, 1975, Ser. No. 552,166**

**Int. Cl.² C09K** *11/16*

**U.S. Cl. 252—301.4 S** **2 Claims**

1. A phosphor consisting essentially of manganese and magnesium activated strontium sulfide containing 400 to 600 ppm manganese and 100 to 300 ppm magnesium.

3,977,992

## CONTROLLED RELEASE CAPSULES

**David A. Hofacker, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation-in-part of Ser. No. 823,164, May 8, 1969, abandoned. This application Nov. 8, 1971, Ser. No. 196,807**

**Int. Cl.² B01J** *13/02*

**U.S. Cl. 252—316** **15 Claims**

1. A capsule comprising a liquid fill and a microporous capsule wall, said microporous capsule wall comprising a dispersed solid phase comprising a first material and a continuous solid phase comprising a second material, said first and second materials being miscible and capable of forming a single phase when both of said materials are in a liquid state, but being capable of forming separate phases upon being cooled to a solid state, the volume contraction ratio being at least about 1.2, said first material being present in a quantity sufficient to provide micropores which extend completely through said capsule wall.

9. A substantially spherical capsule comprising a liquid fill and a microporous capsule wall, said microporous capsule wall comprising a plurality of phases including (1) a solid, crystalline olefinic polymer phase, (2) an amorphous phase comprising a hydrocarbon resin, and (3) an at least partially crystalline wax phase, said phases being miscible and capable of being blended to form a single phase at least when all of said phases are in a molten state; said phase (3) being capable of separating out as a discontinuous mass dispersed throughout a continuous matrix comprising at least one of said phases (1) and (2), thereby assisting in the creation of micropores extending completely through said capsule wall upon cooling of said plurality of phases to a solid state.

3,977,993

## METAL OXIDE AEROGELS

**Thomas J. Lynch, Oakmont, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Mar. 12, 1975, Ser. No. 557,465**

**Int. Cl.² B01J** *13/00*

**U.S. Cl. 252—317** **3 Claims**

1. A modified Kistler process for preparing a silica aerogel which consists essentially of the steps of:

a. Preparing a silica hydrogel,

b. Freeing the silica hydrogel from the bulk of the water associated therewith by contacting said silica hydrogel with an organic solvent that will dissolve at least 10 wt. % water,

c. Thereafter contacting the silica hydrogel of step (b) with the same organic solvent of step (b) that has had its water content reduced to below 200 parts per million by treatment with a molecular sieves drying agent,

d. Continuing the treatment of step (c) until the organic solvent, after reaching equilibrium with the silica hydrogel, contains less than about 200 parts per million of water,

e. Heating the silica hydrogel-organic solvent mixture from step (d) in a pressure-resistant vessel to a pressure at least equal to the critical pressure of the organic solvent and releasing the organic solvent therefrom at said pressure, and

f. Cooling the silica aerogel from step (e) to ambient temperature and pressure under rigorously anhydrous conditions;

the organic solvent employed in the process having a critical pressure not higher than about 100 atmospheres and a critical temperature not higher than about 300°C.

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3,977,994

## RUST INHIBITING COMPOSITION

Edward M. Geiser, Downers Grove, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed June 24, 1974, Ser. No. 482,123
Int. Cl.² C23F 11/14
U.S. Cl. 252—392 10 Claims

1. A rust inhibiting composition consisting essentially of an emulsion of from about 0.5 to about 2.5% by weight of an organic acid containing from 16 to 20 carbon atoms and from about 0.1 to about 5% by weight of an N-alkyl or N-cycloalkyl ethanolamine in water.

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3,977,995

## CALIBRATING FLUID FOR BLOOD CELL COUNTING AND HEMOGLOBIN DETERMINATION

Allan L. Louderback, Temple City, and Anthony J. Fontana, Glendora, both of Calif., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Oct. 17, 1974, Ser. No. 515,760
Int. Cl.² G01N 33/16, 31/22
U.S. Cl. 252—408 3 Claims

1. A calibrating fluid for automated instruments for blood cell counting and hemoglobin determination which is substantially free from red blood cells and which consists essentially of an aqueous isotonic solution containing therein (A) a solubilized material selected from the group consisting of oxyhemoglobin and other hemoglobin derivative products, said solubilized material obtained by completely lysing red blood cells, filtering and recovering the filtrate, and (B) synthetic latex particles selected from the group consisting of polystyrene, polyvinyltoluene, and styrenedivinylbenzene copolymer with a particle size ranging from about 5 to about 20 microns and in an amount of from about 8,000 to about 20,000 particles per cubic millimeter and in which the concentration of (A) as hemoglobin ranges from about 12 gm% to about 20 gm%.

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3,977,996

## CATALYSTS FOR THE OXIRANE-ANHYDRIDE REACTION

Arthur Katzakian, Jr., Sacramento; Herman H. Weyland, Morgan Hill; Roger B. Steele, Fair Oaks, and Marvin H. Gold, Sacramento, all of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Continuation-in-part of Ser. No. 227,645, Feb. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 62,628, Aug. 10, 1970, abandoned. This application June 3, 1974, Ser. No. 475,549
Int. Cl.² C08F 4/22
U.S. Cl. 252—431 C 12 Claims

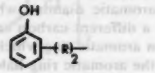
1. A novel synergistic catalyst mixture for use in curing epoxy compounds consisting essentially of:

15 to about 85% by weight of a catalytically active CrIII tricarboxylate which is emerald green in color, showing an absence of absorption at 2750 millimicrons and is a compound of the general empirical formula:

$$Cr(OOCR)_3$$

where R is selected from the group consisting of alkyl, aryl, alkaryl and aralkyl of 1–18 carbon atoms; and

15 to about 85% by weight of a cocatalyst capable of polarizing a carboxylic acid anhydride to yield a reactive carboxylic acid moiety, said cocatalyst being at least one member selected from the group consisting of quaternary-substituted ammonium hydroxides; quaternary-substituted ammonium halides; tri-substituted arsines; quaternary-substituted phosphonium halides; tri-substituted amine oxides; tri-substituted phosphine oxides; tri-substituted phosphines; tri-substituted amines; and mixtures thereof where the substituents are selected from the group consisting of alkyl, aryl, aralkyl and alkaryl and in the case of phosphines and phosphine oxides, the substituent can also be dialkylamino and in the case of amines, the substituent can also be



wherein R is alkyl of 1 to 2 carbon atoms and $h$ is 1 or 0.

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3,977,997

## MANUFACTURE OF A MODIFIED TITANIUM COMPONENT FOR ZIEGLER-NATTA CATALYSTS

Hans Schick, Mannheim; Heinz Mueller-Tamm, and Peter Hennenberger, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Dec. 16, 1974, Ser. No. 533,144
Claims priority, application Germany, Jan. 3, 1974, 2400190
Int. Cl.² B01J 31/02
U.S. Cl. 252—429 B 2 Claims

1. A process for the manufacture of a modified titanium-containing component of a Ziegler-Natta catalyst for the polymerization of $C_{3-6}$ $\alpha$-monoolefins by dry-milling

a. a titanium-containing compound of the general formula

$$TiCl_3 \cdot nAlCl_3,$$

wherein

$n$ denotes a number of from 0 to 0.7, and

b. a phosphorus-containing compound of the general formula

$$O_mPX_3,$$

where

$m$ denotes 0 or 1,

X denotes R, OR or $NR_2$ and

R denotes alkyl, aryl, alkaryl or aralkyl, all of not more than 24 carbon atoms,

in a vibratory ball mill at a grinding acceleration of from 30 to 80 $m \times sec^{-2}$ and in a molar ratio of (a) : (b) of from 1:0.1 to 1:1, which comprises:

1. initially charging a mill which has a useful volume of from 2 to 200 liters, with from 0.1 to 120 kg of the titanium-containing compound (a),
2. milling the process material at a temperature of from −50° to −5°C while the amount of phosphorus-containing compound (b) corresponding to the desired molar ratio is added continuously or in small portions over a period of from 2 to 100 hours,
3. further milling the process material while the temperature thereof is raised to from 5° to 50°C over a period of from 0.1 to 5 hours and then held at this temperature over a period of from 1 to 100 hours.

3,977,998

## PROCESS FOR PREPARING PHOSPHORUS-VANADIUM-OXYGEN CATALYSTS

Marshall C. Freerks, Kirkwood, and Ramon A. Mount, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Sept. 3, 1974, Ser. No. 502,475
Int. Cl.² B01J 27/18
U.S. Cl. 252—435 5 Claims

1. In a process for preparing a phosphorus-vanadium-oxygen complex catalyst having a phosphorus to vanadium atom ratio in the range of about 1:2 to about 2:1, prepared by:

a. contacting a vanadium compound and a phosphorus compound in an acid solution containing a reducing agent under conditions which will provide at least 50 atom percent of the vanadium in the tetravalent state to form a catalyst precursor, said vanadium compound and said phosphorus compound being oxides or compounds thermally convertible to the phosphorus-vanadium-oxygen complex catalyst;

b. recovering the catalyst precursor; and

c. calcining the catalyst precursor structures at temperatures from about 350°C. to about 600°C. for at least two hours, the improvement which comprises calcining the catalyst precursor structures in an inert atmosphere.

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3,977,999

## ALUMINA COMPOSITIONS AND METHODS FOR MAKING AND USING SAME

Henry Erickson, Park Forest, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Filed Sept. 7, 1972, Ser. No. 286,993
Int. Cl.² B01J 27/08, 27/10, 27/12
U.S. Cl. 252—441 18 Claims

1. A composition of matter comprising macrosize particles containing a mixture of two distinct phases, said phases being (1) calcined discrete entities comprising first alumina, a major portion of said entities having a minimum dimension greater than about 50 microns and a maximum dimension of less than 200 microns and (2) a phase comprising calcined second alumina wherein the weight ratio of (1) to (2) is within the range from about 0.05:1 to about 2:1 and said second alumina is first calcined after the formation of macrosize particles.

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3,978,000

## CATALYSTS BASED ON CARBON SUPPORTS

Joseph Lawrence Schmitt, Jr., Bethel, Conn.; Philip Leroy Walker, Jr., State College, Pa., and George Augustus Castellion, Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 19, 1975, Ser. No. 559,997
Int. Cl.² B01J 21/18
U.S. Cl. 252—447 15 Claims

1. A catalyst composition comprising a porous carbon particulate support comprising carbon black spheres in packed relationship and bonded with a carbonized binder, said spheres having a particle size in the range of about 80 to 5000 angstrom units and said particulate having a pore size distribution exhibiting peaks at a pore radius in excess of 10 angstrom units and, carried on said support, an effective amount of a catalytic activator.

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3,978,001

## PREPARATION METHOD FOR A CATALYST

Jarold A. Meyer, Concord, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 250,399, May 4, 1972, abandoned. This application Jan. 31, 1974, Ser. No. 438,504
Int. Cl.² B01J 37/02, 29/12
U.S. Cl. 252—453 17 Claims

2. A method for maufacturing a catalyst comprising:

A. forming a mixture comprising an aqueous gelatinous precipitate containing an intimate admixture a first component, said precipitate comprising an inorganic oxide or precursor thereof;

B. forming a catalyst precursor comprising at least one transition series organic-metal compound precipitate and said gelatinous precipitate by reacting said first component with a second component, said reaction being effected by intimately intermixing said mixture with said second component, said components belonging to different groups, and being selected from the following groups:

a. the group consisting of water-soluble transition metal series compounds; and

b. the group consisting of water-soluble organic gravimetric reagents for said transition series compounds;

C. converting said catalyst precursor to a catalyst, said converting comprising at least a step of maintaining said catalyst precursor at a temperature in the range from about 500°F to 1800°F for a period in the range from about 1 to 48 hours.

3. The method of claim 2 wherein said precipitate comprises on a water-free basis from 40 to 95 weight percent alumina and 60 to 5 weight percent silica.

6. The method of claim 2 wherein said metal compound is a Group VIII metal compound.

9. The method of claim 2 wherein said reagent is an organic gravimetric reagent selected from the group consisting of oximes, azoles, sulfides, and analides.

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3,978,002

## CATALYST USEFUL FOR OLEFIN POLYMERIZATION PROCESS

Henri A. Aboutboul, Brussels, Belgium; William Kirch, Clinton, Iowa, and Jerome H. Krekeler, Cincinnati, Ohio, assignors to National Petro Chemicals Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 311,579, Dec. 4, 1972, which is a continuation of Ser. No. 122,502, March 9, 1971, abandoned, which is a continuation of Ser. No. 750,467, Aug. 6, 1968, abandoned, Continuation-in-part of Ser. No. 294,270, Oct. 10, 1972, abandoned, which is a continuation of Ser. No. 70,622, Aug. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 750,733, Aug. 6, 1968, Pat. No. 3,652,214, and a continuation-in-part of Ser. No. 750,734, Aug. 6, 1968, Pat. No. 3,652,215, and a continuation-in-part of Ser. No. 766,693, Oct. 11, 1968, Pat. No. 3,652,216, Continuation-in-part of Ser. No. 326,645, Jan. 26, 1973, which is a continuation of Ser. No. 148,117, May 28, 1971, abandoned, which is a continuation of Ser. No. 750,734, Aug. 6, 1968, Pat. No. 3,652,215. This application July 9, 1974, Ser. No. 486,788
Int. Cl.² B01J 29/16, 29/00
U.S. Cl. 252—456 6 Claims

1. An olefin polymerization catalyst comprising a metal-containing catalytic material deposited on a silica xerogel support, said silica xerogel having

a. a nitrogen pore volume greater than 1.96 cc/g and up to 2.90 cc/g, said pore volume being equal to the volume of the pores in said gel having pore diameters of up to 600 A and being determined as that volume of nitrogen adsorbed by and condensed in the pores of said gel per gram of the dry gel at the normal boiling point of liquid nitrogen and at a relative pressure P/Po equal to 0.967 wherein P is the pressure of the nitrogen vapor over the gel and Po is the vapor pressure of liquid nitrogen;

b. the major portion of said nitrogen pore volume being provided by pores having pore diameters within the range of from 300–600 A; and

c. a surface area within the range of from 200–500 $m^2/g$.

2. The olefin polymerization catalyst of claim 1, wherein said metal-containing catalytic material is a metal oxide selected from the group consisting of an oxide of chromium, cobalt, nickel, vanadium, molybdenum, and tungsten.

3,978,003

## PROCESS FOR THE OXIDATION OF OLEFINS TO UNSATURATED ALDEHYDES AND NITRILES AND CATALYSTS THEREFORE

Robert K. Grasselli, Warrensville Hts., and Maria S. Friederich, Cleveland, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 205,705, Dec. 7, 1971, Pat. No. 3,859,358, and a continuation-in-part of Ser. No. 16,923, March 5, 1970, Pat. No. 3,666,822, which is a continuation of Ser. No. 691,934, Dec. 20, 1967, Pat. No. 3,542,842. This application Jan. 22, 1974, Ser. No. 435,447

The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.

Int. Cl.² B01J *23/28, 23/88*

U.S. Cl. 252—456 6 Claims

1. A catalyst composition consisting essentially of an activated catalytic oxide complex of uranium and molybdenum having a composition corresponding to the empirical chemical formula $U_xMo_yO_z$ where $x$ is a number within the range from 1 to about 25, $y$ is a number of from 1 to about 25, and $z$ is a number taken to satisfy the average valences of uranium and molybdenum in the oxidation states in which they exist in said catalyst.

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3,978,004

## CATALYSTS FOR THE TREATMENT OF GASES CONTAINING VARIOUS DERIVATIVES OF SULPHUR

Jean-Claude Daumas, Orsay; Georges Dupuy, Fontenay-aux-Roses, and Max Michel, Yerres, all of France, assignors to Rhone-Progil, Courbevoie, France

Filed Aug. 1, 1974, Ser. No. 493,761

Claims priority, application France, Aug. 30, 1973, 73.31383

Int. Cl.² B01J *21/04, 23/10*

U.S. Cl. 252—462 1 Claim

1. A Claus reaction catalyst for treatment of industrial gases containing hydrogen sulphide and sulphurous anhydride in which the catalyst consists essentially of activated alumina as a support having a specific surface area of at least 80 sq.m./g and at least one oxide of a metal selected from the group consisting of yttrium, lanthanum, praseodymium, neodymium, samarium and gadolinium as the essential catalyst component present in an amount within the range of 1–20% by weight and which may contain in addition a small amount of an oxide of a metal selected from the group consisting of titanium, cobalt, nickel, iron and uranium.

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3,978,005

## CATALYST FOR CONTACT REDUCTION OF NOx IN ENGINE EXHAUST GASES AND METHOD OF PRODUCING SAME

Sakae Kawagoshi, Yokohama, and Muneyuki Kubo, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed July 29, 1974, Ser. No. 492,765

Claims priority, application Japan, Aug. 1, 1973, 48-85787

Int. Cl.² B01J *23/72, 23/76*

U.S. Cl. 252—470 3 Claims

1. A catalyst for contact reduction of oxides of nitrogen in an exhaust gas from an internal combustion engine, comprising a carrier made of a heat and corrosion-resistant metal and a coating of a catalytic alloy deposited on said carrier, said alloy consisting of 60 to 95% by weight nickel, 2.5 to 20% by weight copper and 2.5 to 20% by weight cobalt.

3,978,006

## METHODS FOR PRODUCING OXYGEN-SENSING ELEMENT, PARTICULARLY FOR USE WITH INTERNAL COMBUSTION ENGINE EXHAUST EMISSION ANALYSIS

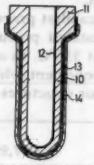
Bernhard Topp, Gerlingen; Horst Neidhard, Korntal; Rudolf Pollner, Kornwestheim, and Karl-Hermann Friese, Leonberg, all of Germany, assignors to Robert Bosch G.m.b.H., Gerlingen-Schillerhohe, Germany

Division of Ser. No. 259,134, June 2, 1972, abandoned. This application Sept. 23, 1974, Ser. No. 508,250

Claims priority, application Germany, Feb. 10, 1972, 2206216

Int. Cl.² B01J *35/00;* F01N *3/00*

U.S. Cl. 252—477 R 15 Claims




1. Method to make a sensing element for electro-chemical sensing of oxygen content in exhaust gases from internal combustion engines, the sensing element being an oxygen concentration cell and including a solid oxygen ion conductive electrolyte body having an inner surface covered at least in part by an inner electrode and an outer surface adapted to contact oxygen from said exhaust gases, the method comprises applying, by means of thin layer techniques, an electron-conductive catalyst layer electrode of a material which catalyzes the gas equilibrium and covering at least part of said outer surface, said material being formed with micro pores in those regions thereof where its thickness is greater than about 100 A, and heating said electron-conductive catalyst layer, after application thereof to the electrolyte body, at a temperature between 200° C and two-thirds the melting temperature T in ° K of said electron-conductive catalyst layer to form said micro pores, and applying an outer protective layer covering all of said electron-conductive catalyst layer and all parts of said outer surface which are not covered by said electron-conductive catalyst layer, at least the part of said outer protective layer covering said electron-conductive layer being porous.

8. Method to make sensing element for electro-chemical sensing of oxygen content in exhaust gases from internal combustion engines, the sensing element being an oxygen concentration cell, comprising

providing an unsintered raw body of solid oxygen ion conductive electrolyte material;

applying a paste of fine particle ceramic material and fine particle catalyst material which catalyzes the gas equilibrium with a thinning oil to at least a part of one surface of the solid electrolyte body;

sintering the body with the paste thereon to form a catalyst layer electrode on said solid electrolyte body, having micro pores extending through said catalyst layer, and applying an outer protective layer covering all of said catalyst layer and all parts of said surface of said solid electrolyte body upon which said catalyst layer is applied and which are not covered by said catalyst layer, at least the part of said outer protective layer covering said electron-conductive layer being porous.

3,978,007

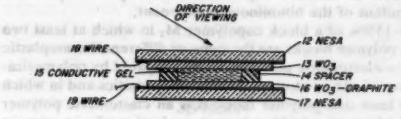
## SIMPLE, BONDED GRAPHITE COUNTER ELECTRODE FOR EC DEVICES

Robert Domenico Giglia, Rye, N.Y., and Richard Howard Clasen, West Redding, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 206,419, Dec. 9, 1971, Pat. No. 3,827,784. This application Nov. 23, 1973, Ser. No. 418,492

Int. Cl.[2] H01B 1/06

U.S. Cl. 252—506 4 Claims




1. A method for forming a counter-electrode comprising graphite and a persistent electrochromic material, which comprises the steps of forming a layer of an admixture of graphite with a binder selected from silicates, epoxies, polesters and polyethylenes, heat curing said binder, and applying to said admixture of graphite binder said persistent electrochromic material admixed with ammonium hydroxide.

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3,978,008

## SESQUITERPENIC DERIVATIVES AS ODOR- AND TASTE-MODIFYING AGENTS

Karl-Heinrich Schulte-Elte, Onex-Geneva; Michel Joyeux, Carouge-Geneva, and Günther Ohloff, Bernex-Geneva, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

Filed Aug. 22, 1974, Ser. No. 499,556

Claims priority, application Switzerland, Mar. 7, 1974, 3196/74

Int. Cl.[2] A61K 7/46; C11B 9/00

U.S. Cl. 252—522 2 Claims

1. A perfuming composition which comprises as one of its active ingredients a product selected from the group consisting of 4,4,8-trimethyltricyclo [6.3.1.$0^{2,5}$] dodec-1-yl formate and 4,4,8-trimethyltricyclo [6.3.1.$0^{1,5}$] dodec-2-yl formate.

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3,978,009

## SUBSTITUTED (2-METHYL-5-ISOPROPYL-CYCLOPENT-1-EN-1-YL)s AS ODOR-MODIFYING AGENTS

Karl-Heinrich Schulte-Elte, Onex, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

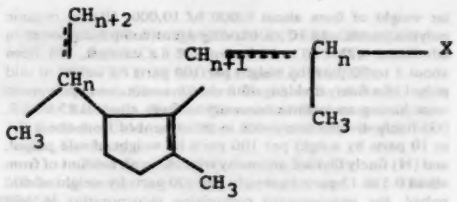
Division of Ser. No. 436,786, Jan. 25, 1974, Pat. No. 3,937,723. This application May 30, 1975, Ser. No. 582,266

Claims priority, application Switzerland, Feb. 9, 1973, 1941/73

Int. Cl.[2] C11B 9/00

U.S. Cl. 252—522 9 Claims

1. A process for modifying, enhancing or improving the odoriferous properties of perfume compositions which comprises adding thereto an olfactive amount of at least one of the compounds of formula




containing a single or a double bond in the positions indicated by the dotted lines and wherein:

*n* stays for zero or 1; and X represents a univalent radical of formula $—CH_2—OR^1$

wherein R is an alkyl radical containing from 1 to 6 carbon atoms, and $R^1$ represents a hydrogen atom or an acyl radical containing from 1 to 6 carbon atoms.

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3,978,010

## AQUEOUS WINDSHIELD CLEANER FORMULATION COMPRISING AMINE SALTS, METHANOL AND BORIC ACID

D. Bruce Bright, Ferguson, Mo., and Paul J. Alderholt, Belleville, Ill., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 20, 1973, Ser. No. 426,838

Int. Cl.[2] C11D 3/006, 1/18

U.S. Cl. 252—525 7 Claims

1. A glass-cleaning composition consisting essentially of the following ingredients in the indicated weight proportions, based on 100 parts by weight:

| | | |
|---|---|---|
| a. | amine salt of an aminopolycarboxylic acid chelating agent | 0.001 to 5.0 |
| b. | amine salt of an anionic linear alkylated aryl sulfonic acid | 0.01 to 10.0 |
| c. | boric acid | 0.02 to 3 |
| d. | inhibitor of copper/brass corrosion | 0.0005 to 0.5 |
| e. | methanol | 5 to 60 |
| f. | water | remainder |

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3,978,011

## FLAME RETARDANT FLEXIBLE URETHANE FOAMS

Robert A. Molbert, Cuyahoga Falls, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 427,880, Dec. 26, 1973, Pat. No. 3,884,849. This application Jan. 13, 1975, Ser. No. 540,378

Int. Cl.[2] C08G 18/08

U.S. Cl. 260—2.5 AJ 10 Claims

1. In the production of a flexible or semi-flexible low density, flame retardant polyurethane foam using the one-shot or prepolymer process by the reaction of (A) a polyetherpolyol having from two to four hydroxyl groups and having a molecu-

lar weight of from about 1,000 to 10,000, (B) an organic polyisocyanate and (C) a blowing agent comprising water in admixture with (D) a surfactant, (E) a catalyst, (F) from about 1 to 50 parts by weight per 100 parts by weight of said polyol of a finely divided, solid chlorine-containing polymeric resin having an intrinsic viscosity of from about 0.25 to 2.5, (G) finely divided zinc oxide in an amount of from about 0.1 to 10 parts by weight per 100 parts by weight of said polyol, and (H) finely divided antimony trioxide in an amount of from about 0.5 to 15 parts by weight per 100 parts by weight of said polyol, the improvement comprising incorporating in said formulation prior to foaming a zinc salt of an organic mono dithiocarbamic acid, said salt having from 1 to 25 carbon atoms in each acid moiety of said salt, and said salt being used in an amount of from about 0.01 to 0.90 part by weight, computed as metallic zinc, per 100 parts by weight of total polyol, to prevent or reduce discoloration of said foam during the production of the same.

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**3,978,012**

## INJECTION MOLDABLE THERMOSETTABLE PHENOL-ALDEHYDE RESIN COMPOSITION AND PROCESS

**Thornton R. Calkins, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.**

**Continuation-in-part of Ser. No. 303,844, Nov. 6, 1972, abandoned. This application Aug. 23, 1974, Ser. No. 500,113**

**Int. Cl.² C08G** *8/00, 8/32*

**U.S. Cl. 260—19 R** **7 Claims**

1. A heat fusible thermosettable injection molding composition comprising a mixture of a thermosettable phenol-aldehyde resin and a filler in pellet form having a diameter of at least 1/16 inch having in admixture with said pellet and having thereon a metallic salt of a long chain fatty acid of 8–20 carbon atoms.

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**3,978,013**

## ADHESIVE COMPOSITION

**Pallavoor R. Lakshmanan, Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Dec. 26, 1974, Ser. No. 536,317**

**The portion of the term of this patent subsequent to July 22, 1993, has been disclaimed.**

**Int. Cl.² C08L** *93/00*

**U.S. Cl. 260—27 BB** **6 Claims**

1. An adhesive composition consisting essentially of a styrene-butadiene block copolymer, a coumarone-indene tackifier, a solvent selected from the group consisting of aromatic hydrocarbons having from six to eight carbon numbers, aliphatic hydrocarbons having from six to eight carbon atoms, ketones having from two to four carbon atoms and esters having from two to four carbon atoms, said solvents having a boiling point between about 50° and 145° C. and water wherein the components thereof are present in the following ranges:

| Component | Weight percent |
|---|---|
| Styrene-Butadiene Block Copolymer | 100 |
| Tackifier | 10–400 |
| Solvent | 100–5,000 |
| Water | 0.05–10. |

**3,978,014**

## BITUMINOUS COMPOSITIONS CONTAINING TWO POLYMERS

**Eric J. van Beem, and Pieter Brasser, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Feb. 28, 1975, Ser. No. 553,948**

**Claims priority, application Netherlands, Aug. 27, 1974, 7411373**

**Int. Cl.² C08L** *91/00*

**U.S. Cl. 260—28.5 AS** **10 Claims**

1. A bituminous composition comprising:
   a. 92–75%w of a bituminous component Q whose aromaticity expressed as a fraction of aromatic carbon of the n-heptane maltene phase ($F_a$) is higher than $0.004 \times P + 0.280$, in which P represents the n-heptane asphaltene content of the bituminous component;
   b. 4–15%w of a block copolymer $M_1$ in which at least two A polymer blocks are the same or different thermoplastic non-elastomeric polymer blocks prepared by polymerization of one or more monoalkenyl aromatics and in which at least one polymer block B is an elastomeric polymer block prepared either by polymerization of one or more conjugated alkadienes, or by copolymerization of one or more conjugated alkadienes with one or more monoalkenyl aromatics, polymer block B, mentioned above, being completely or partly hydrogenated, if desired; and
   c. 4–15%w of a thermoplastic polymer $M_2$ differing from component $M_1$ and having a molecular weight higher than 10,000, a solubility parameter between 7.8 and 8.8 and a crystallinity of less than 60 percent at 25°C.

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**3,978,015**

## THREE COMPONENT ELECTRODEPOSITION SYSTEM

**Bernard L. Kolish, Raritan, N.J.; Wesley K. Senseman, Cleveland Heights, and Clayton H. Konker, Euclid, both of Ohio, assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Apr. 5, 1971, Ser. No. 131,418**

**Int. Cl.² C08L** *61/20*

**U.S. Cl. 260—29.4 UA** **12 Claims**

1. An aqueous emulsion adapted for electrophoretic film deposition comprising 15 –50 % of non-water dispersible resinous polyol which is thermoplastic per se and has an hydroxy value of at least 20 emulsified in the continuous aqueous phase of 15–50% of said emulsion by means of a resinous hydroxy functional polycarboxylic acid emulsifying agent, the resin of said emulsifying agent having an hydroxy value of at least 20 and an acid number of at least 30, said emulsifying agent being reacted with base to form salts which are dissociated in said aqueous phase, said emulsion further including 5–50% of aminoplast resin for curing said emulsifying agent and said polyol, said percentages all being based on the total weight of non-volatile vehicle.

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**3,978,016**

## PIGMENTARY PRINTING PASTES FOR TEXTILES

**Jean Perronin, Chantilly, and Rene Paul Auguste Decamp, Villers Saint Paul, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

**Filed Apr. 26, 1974, Ser. No. 464,727**

**Claims priority, application France, Apr. 27, 1973, 73.15341**

**Int. Cl.² C08L** *31/04*

**U.S. Cl. 260—29.6 TA** **7 Claims**

1. Aqueous pigmentary printing pastes for textile fibers containing a pigment and a thickener in which the thickener is a latex, having a proportion of dry material of from 30% to 50%, of a water-soluble copolymer having a glass transition temperature of from 20°C to 100°C and containing in interpolymerized form the following components:
   a. 40% to 60% by weight of acrylic acid, methacrylic acid, crotonic acid or mixtures thereof;

b. 10% to 30% by weight of a vinyl ester of an organic or mineral acid;
c. 50% to 30% by weight of one or more ethylenic monomers, other than the above-mentioned esters, which form water-insoluble homopolymers;
d. 0% to 5% by weight of one or more monomers containing an ethylenic linkage and one or more polar groups; and
e. 0% to 5% by weight of one or more monomers containing several ethylenic linkages;

the proportion of said latex in the pastes being 0.5% to 15% and said copolymer being partially or totally neutralized.

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## 3,978,017
## PRODUCTION OF HIGH SOLIDS CONTAINING POLYETHYLENE EMULSIONS

**Glenn E. Teer; Jerry G. Higgins, and George D. Warren, all of Big Spring, Tex., assignors to Cosden Technology, Inc., Big Spring, Tex.**

**Filed Feb. 7, 1975, Ser. No. 547,947**
**Int. Cl.² C08L *23/06***
**U.S. Cl. 260—29.6 XA** **11 Claims**

1. A process of producing improved stable polyethylene emulsions of high solids content comprising:
a. introducing into a polymerization zone an aqueous reaction medium containing from 0.5 to about 1.5 weight percent thereof of water soluble persulfate initiator and from about 5.5 to about 10 weight percent of an emulsifier consisting essentially of an alkyl benzene sulfonate wherein the alkyl group has from about 6 to about 18 carbon atoms;
b. introducing ethylene into a reaction zone containing said aqueous medium at a pressure in the range of from about 15,000 psi to about 45,000 psi while agitating said aqueous medium and maintaining said polymerization zone at a temperature in the range of from about 70°C to about 120°C thereby forming polyethylene particles suspended in said aqueous medium; and
c. allowing said polyethylene particles to form in said aqueous medium until a solids level of at least about 30 percent by weight thereof is obtained.

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## 3,978,018
## POLYMERIZABLE COMPOSITIONS CONTAINING UNSATURATED POLYESTER RESINS AND AQUEOUS ALKALI STABILIZED COLLOIDAL SILICA, METHOD OF PREPARING SHAPED ARTICLES FROM SUCH COMPOSITIONS AND THERMOSET PRODUCTS THEREOF

**James M. Self, Pittsburgh, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.**

**Filed June 17, 1974, Ser. No. 480,169**
**Int. Cl.² C08K *3/36***
**U.S. Cl. 260—40 R** **26 Claims**

1. A polymerizable composition comprising one part by weight of unsaturated polyester resin syrup; 0.1 to 10 parts by weight of aqueous alkali stabilized colloidal silica; and a polymerization initiator for the said unsaturated polyester resin syrup.

## 3,978,019
## PROCESS FOR PRODUCTION OF DEEP COLORED SMALL PARTICLE SIZE GAS BLACK WITH LOW CONTENT OF EXTRACTABLE MATTER

**Alfred Oelmann; Claus Richard Engel, both of Bruhl, and Lothar Rothbuhr, Hermuhlheim, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany**

**Filed Jan. 28, 1975, Ser. No. 544,771**
**Claims priority, application Germany, Jan. 31, 1974, 2404536**
**Int. Cl.² C09C *1/48***
**U.S. Cl. 260—42.2** **10 Claims**

1. In a process of preparing carbon black employing a cooling roll, for deposition of carbon black particles by the gas black process employing a carrier gas and vapor of a carbon black forming oil the improvement comprising preparing deeply colored carbon black with low extractable matter content having a primary particle size of about 8 to 25 nm by utilizing as the carrier gas at least about 50 volume % of hydrogen and collecting the carbon black deposited on the cooling roll.

8. In a composition comprising a polymer and carbon black as a coloring agent therefor, the improvement comprising employing as the carbon black the carbon black formed in claim 1.

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## 3,978,020
## THERMALLY STABLE POLYCARBONATE

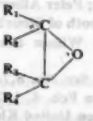
**Frank Nunzio Liberti, Mount Vernon, Ind., assignor to General Electric Company, Pittsfield, Mass.**

**Continuation-in-part of Ser. No. 320,253, Jan. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 28,054, April 13, 1970, abandoned. This application Jan. 8, 1975, Ser. No. 539,294**
**Int. Cl.² C08J *3/20***
**U.S. Cl. 260—45.8 A** **4 Claims**

1. A thermal oxidatively stable aromatic polycarbonate composition stabilized with (a) 0.005 to about 1.0 weight percent based on the weight of the aromatic polycarbonate composition of a phosphonite of the following formula:

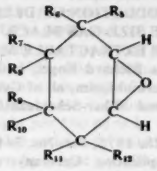
wherein $R_1$, $R_2$, and $R_3$ are independently selected from the group consisting of unsubstituted and halogen substituted alkyl, aryl, cycloalkyl, aralkyl and alkaryl radicals of 1–25 carbon atoms, and (b) 0.01 – 0.5 weight percent of an epoxy compound selected from the group consisting of:

I. Derivatives of epoxy ethane represented by the following formula:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are independently selected from the group consisting of hydrogen, an alkyl radical of 1–24 carbon atoms, an aryl radical of 6–24 carbon atoms, $—CH_2OR'$, $—CH_2OCOR'$, $—CH_2OCOR''COOCH_2X$, $CH_2OR''OCH_2X$ wherein R′ is selected from the group consisting of an alkyl radical of 1–24 carbon atoms or an aryl radical of 6 to 24 carbon atoms and wherein R″ is an alkylene radical of 1–24 carbon atoms and X is an oxirane ring.

II. Derivatives of epoxy cyclohexane represented by the following formula:



wherein $R_5$ through $R_{12}$ are independently selected from the group consisting of hydrogen, alkyl radicals of 1–24 carbon atoms, $-COOR_{13}$, $-OCOR_{13}$, $-COOR_{14}X$, $-OCOR_{14}-COOX$ wherein $R_{13}$ is an alkyl radical of 1–24 carbon atoms and $R_{14}$ therein is an alkylene radical of 1–24 carbon atoms and X is an oxirane ring.

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**3,978,021**

**INHIBITING OZONE DETERIORATION OF RUBBERS**

**Seiji Sagawa, Kawachinagano; Hideo Yamato, Saitama, and Shuichi Kanagawa, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Continuation-in-part of Ser. No. 437,219, Jan. 28, 1974. This application Feb. 3, 1976, Ser. No. 654,875**

**Claims priority, application Japan, Jan. 31, 1973, 48-13099**

**Int. Cl.² C08J *3/20***

**U.S. Cl. 260—45.9 KA** **1 Claim**

1. A method for inhibiting ozone deterioration of rubber which is selected from the group consisting of natural rubber, styrene-butadiene rubber with cis-1,4-structure content of 5–20 percent, chloroprene rubber, butadiene rubber with cis-1,4-structure content of 5–20 percent, isobutylene-isoprene rubber, isoprene rubber, nitrile butadiene rubber and ethylene-propylene terpolymer, which comprises adding to the rubber, 0.01 to 10 percent based on the weight of the rubber, of thiodipropionitrile.

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**3,978,022**

**THERMAL STABILIZATION OF ACRYLIC POLYMERS**

**William F. Carson, Jr., Louisville, Ky., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 486,292, July 8, 1974, abandoned. This application Mar. 28, 1975, Ser. No. 563,246**

**Int. Cl.² C08J *3/20***

**U.S. Cl. 260—45.7 S** **13 Claims**

1. A composition comprising a methyl methacrylate-containing polymer containing about 0.001 to 1 percent by weight of a thermal stabilizer comprising a di-t-alkyl disulfide.

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**3,978,023**

**STABILIZATION OF POLYMERIC COMPOSITIONS**

**Harold Coates, Wombourne; Peter Albert Theodore Hoye, and Anthony James Wilkins, both of Stourbridge, all of England, assignors to Albright & Wilson Limited, Oldbury, near Birmingham, England**

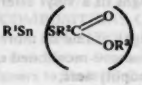
**Continuation-in-part of Ser. No. 8,748, Feb. 4, 1970, abandoned. This application Feb. 4, 1972, Ser. No. 223,743**

**Claims priority, application United Kingdom, Feb. 4, 1969, 5906/69**

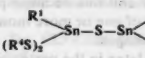
**Int. Cl.² C08J *3/20***

**U.S. Cl. 260—45.75 S** **12 Claims**

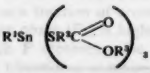
1. A stabilized polymer composition wherein the polymer is selected from homopolymers of vinyl chloride and vinylidene chloride and copolymers wherein the major component is vinyl chloride, vinylidene chloride or mixtures thereof, and the stabilizer comprises (1) between 1 and 5%, based on the weight of said polymer, of an organotin compound exhibiting a general formula selected from the group consisting of



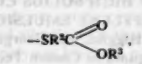
$(R^1SnS_{1.5})_n$,



or physical mixtures of



and a compound of formula $R_2^3SnS$, wherein $R^1$ and $R^3$ are individually selected from alkyl radicals containing between 3 and 18 carbon atoms, aryl and alkaryl radicals, $R^2$ represents an alkylene hydrocarbon radical containing up to 8 carbon atoms, $R^4$ represents the radical



$n$ is an integer between 2 and 5 and (2) between 2 and 10%, based on the weight of said polymer, of a mixed alkyl-aryl triester of phosphorous acid, the molar ratio of said mixed alkyl-aryl triester to said organotin compounds being between 1.0:1 and 2.5:1.

4. A stabilized composition as described in claim 1 wherein there is also present an epoxy compound.

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**3,978,024**

**FLAME RETARDANT POLYCARBONATE COMPOSITION**

**Victor Mark, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.**

**Filed Dec. 28, 1973, Ser. No. 429,126**

**Int. Cl.² C08K *5/42, 5/51, 5/54***

**U.S. Cl. 260—45.85 T** **9 Claims**

1. A flame retardant carbonate polymer composition comprising in admixture a carbonate polymer and a minor amount of a metal salt of an unsubstituted and substituted monomeric phenol ester sulfonic acid and mixtures thereof, wherein the metal salts are selected from the group consisting of the alkali metal salts and alkali earth metal salts and mixtures of these metal salts, and the substituent on the metal salts of the substituted monomeric phenol ester sulfonic acid is selected from the group consisting of an electron withdrawing radical, and mixtures of electron withdrawing radicals.

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**3,978,025**

**LIQUID METHYL VINYLPHENYLPOLYSILOXANE RESINS**

**Robert Magne, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France**

**Filed Sept. 6, 1974, Ser. No. 503,771**

**Claims priority, application France, Sept. 10, 1973, 73.32456; July 31, 1974, 74.26668**

**Int. Cl.² C08G *77/04***

**U.S. Cl. 260—46.5 UA** **15 Claims**

1. A liquid methylvinylphenylpolysiloxane resin comprising recurring units chosen from more than one of the formulae: $CH_3SiO_{1.5}$, $(CH_3)_2SiO$, $CH_3(CH_2{=}CH)SiO$, $CH_3(C_6H_5)SiO$, $C_6H_5SiO_{1.5}$ and $(C_6H_5)_2SiO$, and corresponding to the average general formula:

$(CH_3)_x(C_6H_5)_y(CH_2{=}CH)_z(OQ)_u(OH)_wSiO_{\frac{4-x-y-z-u-w}{2}}$

in which Q represents an alkyl group with 1 to 4 carbon atoms, $x$ and $y$, which may be identical or different, each represent a number from 0.55 to 0.85, $z$ represents a number from 0.08 to 0.35, $u$ represents a number from 0.08 to 0.3, and $w$ represents a positive number which does not exceed 0.1, the sum $x + y + z$ being from 1.5 to 1.9 and having a functional group content E of from 2.5 to 2.9.

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**3,978,026**

## CATALYSIS OF THE OXIRANE-ANHYDRIDE REACTION

**Arthur Katzakian, Jr., Sacramento; Herman H. Weyland, Morgan Hill; Roger B. Steele, Fair Oaks, and Marvin H. Gold, Sacramento, all of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.**

**Continuation-in-part of Ser. No. 227,645, Feb. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 62,628, Aug. 10, 1970, abandoned. This application June 3, 1974, Ser. No. 475,546**

**Int. Cl.² C08F *4/72*; C08G *59/18*, *59/42***

**U.S. Cl. 260—47 EC** **16 Claims**

1. In the method of reacting an epoxy compound containing at least one oxirane ring with carboxylic acid anhydride; in the presence of a catalyst, the improvement wherein the catalyst comprises a synergistic mixture of an active trivalent chromium III carboxylate which is emerald green in color and is absent absorption at 2750 millimicrons and a cocatalyst containing substituents selected from the group consisting of alkyl, aryl, aralkyl and alkaryl, said cocatalyst being selected from tri- and tetra-substituted compounds of the group consisting of quaternary-substituted ammonium halides; quaternary-substituted ammonium hydroxides; quaternary-substituted phosphonium halides; tri-substituted arsines; tri-substituted amine oxides; tri-substituted phosphine oxides; tertiary-substituted phosphines; tertiary-substituted amines; and mixtures thereof, each alone or in combination with one or more reactive promoters selected from the group consisting of mono carboxylic acids, phenols and mono alcohols, and compounds containing two or more of the co-catalytic functional groups from the cocatalysts set forth above, in the same molecule, alone or in combination with any and all of the reactive promoters, said chromium III carboxylate and cocatalyst each being present in the reaction mixture at a level of at least 0.015 weight percent.

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**3,978,027**

## PROCESS FOR REACTING A PHENOL WITH AN EPOXY COMPOUND

**Clifford D. Marshall, Cherry Hill, N.J., assignor to Shell Oil Company, Houston, Tex.**

**Filed May 7, 1975, Ser. No. 575,276**

**Int. Cl.² C08G *30/04***

**U.S. Cl. 260—47 EP** **2 Claims**

1. In the process for producing polepoxide resins having a weight per epoxide of between about 2,000 and about 4,000 by reacting a liquid diglycidyl ether of 2,2-bis(4-hydroxyphenyl)propane having a weight per epoxide of between about 140 and about 500 and a saponifiable chlorine content of between about 0.1% weight and about 1.0% weight with 2,2-bis(4-hydroxyphenyl)propane in the presence of a potassium iodide catalyst, the improvement wherein said liquid diglycidyl ether of 2,2-bis(4-hydroxyphenyl)propane and said 2,2-bis(4-hydroxyphenyl)propane are contacted at a temperature of between about 250°F and about 400°F for between about 15 minutes and about 60 minutes prior to the addition of the potassium iodide catalyst.

**3,978,028**

## PROCESS FOR PREPARING s-TRIAZINE PREPOLYMERS BY CONDENSATION OF AN AROMATIC POLYHYDROXY COMPOUND WITH CYANURIC CHLORIDE AND THEREAFTER REACTING THE CONDENSATION PRODUCT WITH CYANOGEN HALIDE IN THE PRESENCE OF BASE

**Rudolf Sundermann, Leverkusen; Rolf Putter, Duesseldorf, and Ernst Grigat, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Dec. 4, 1974, Ser. No. 529,663**

**Claims priority, application Germany, Dec. 6, 1973, 2360709**

**Int. Cl.² C08G *73/06***

**U.S. Cl. 260—61** **11 Claims**

1. Process for preparing s-triazine prepolymers which comprises contacting under condensation conditions an aromatic dihydroxy or polyhydroxy compound with less than ½ mol of cyanuric chloride per hydroxy group, thereafter reacting the free hydroxy groups in the condensation product with a cyanogen halide in the presence of a base.

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**3,978,029**

## PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME

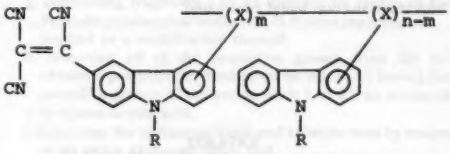
**William W. Limburg, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation-in-part of Ser. No. 374,157, June 27, 1973, abandoned. This application Feb. 20, 1974, Ser. No. 444,216**

**Int. Cl.² C08F *22/30*, *26/12***

**U.S. Cl. 526—260** **6 Claims**

1. A photoconductive polymer of the formula:



wherein X is a structural unit of the backbone of the photoconductive polymer;

R is an aliphatic hydrocarbon radical having anywhere from 1 to 10 carbon atoms, phenyl or substituted phenyl, said phenyl substituent being capable of contribution of electrons to relatively electron deficient centers on the carbazyl functional group;

$n$ is the total number of carbazyl functional groups pendant from the backbone of the photoconductive polymer; and

$m$ is at lest 0.1 percent of the total number of carbazyl functional groups pendant from the backbone of the photoconductive polymer.

**3,978,030**

## POLYMERS OF FLUORINATED DIOXOLES

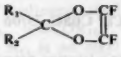
**Paul Raphael Resnick, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 384,498, Aug. 1, 1973, Pat. No. 3,865,845, which is a continuation-in-part of Ser. No. 118,559, Feb. 24, 1971, abandoned. This application Dec. 12, 1974, Ser. No. 532,242**

**Int. Cl.[2] C08F** *214/00, 214/08, 214/22, 124/00*

**U.S. Cl. 526—247** **6 Claims**

1. A copolymer of fluorinated dioxole of the formula



wherein $R_1$ and $R_2$ are the same or different both consisting of 1 to 3 carbon atoms which are perhalosubstituted and containing at least one fluorine atom whereby the perhalosubstitutuents are selected from the group consisting of chlorine and fluorine atoms and a comonomer selected from the class consisting of chlorotrifluoroethylene, vinylidene fluoride and hexafluoropropene.

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**3,978,031**

## PROCESS FOR THE POLYMERIZATION OF OLEFINS AND CATALYTIC PRODUCTS

**Luigi Reginato, Brussels; Charles Bienfait, Vilvoorde, and Jacques Stevens, Braine L'Alleud, all of Belgium, assignors to Solvay & Cie, Belgium**

**Continuation of Ser. No. 186,764, Oct. 5, 1971, abandoned. This application Oct. 25, 1974, Ser. No. 518,198**

**Claims priority, application Luxemburg, Oct. 8, 1970, 61838**

**Int. Cl.[2] C08F** *4/02, 10/02*

**U.S. Cl. 526—352** **10 Claims**

1. Catalysts for the polymerization and copolymerization of α-olefins comprising an alkyl aluminum compound, and a cocatalyst consisting essentially of the reaction product of a heat-activated fluorinated alumina having an atomic ratio of fluorine/aluminum of 0.01 to 0.30 and a compound of titanium metal selected from chlorides, oxychlorides, alkoxychlorides and oxyalkoxychlorides, said alumina being activated by heat at a stage prior to reaction of the fluorinated alumina with the transition metal compound.

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**3,978,032**

## POLYMERIZATION OF ETHYLENICALLY UNSATURATED MONOMER

**James A. Manner, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Feb. 28, 1975, Ser. No. 553,949**

**Int. Cl.[2] C08F** *114/06, 214/06*

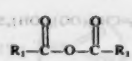
**U.S. Cl. 526—344** **17 Claims**

1. In the process for polymerizing ethylenically unsaturated material selected from the group consisting of vinyl chloride and mixtures of vinyl chloride and copolymerizable monomer, said mixture containing greater than 50 mole percent vinyl chloride, in an aqueous or bulk polymerization medium, the improvement which comprises conducting said polymerization in the presence of an initiator system comprising, in combination,

a. alkaline buffering reagent,

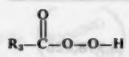
b. organic acid anhydride

represented by the general formula:



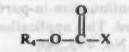
wherein $R_1$ is selected from the group consisting of substituted and unsubstituted $C_1 - C_{20}$ alkyl, $C_6 - C_{10}$ cycloalkyl, and $C_6 - C_{10}$ aryl radicals,

c. peroxygen compound selected from the group consisting of organic peroxy acid and hydrogen peroxide, said organic peroxy acid being represented by the general formula:



wherein $R_3$ is selected from the group consisting of substituted and unsubstituted $C_1 - C_{20}$ alkyl and $C_6 - C_{10}$ aryl radicals, and

d. hydrocarbon haloformate represented by the general formula:



wherein $R_4$ is selected from the group consisting of $C_1 - C_{20}$ alkyl, $C_6 - C_{12}$ cycloalkyl, $C_7 - C_{10}$ aralkyl, and $C_6 - C_8$ aryl radicals and X is chloride or bromine,

the mole ratio of hydrocarbon haloformate to acid anhydride being between about 0.1:1 and about 10:1, thereby generating polymerization initiator in situ in said polymerization medium, said acid anhydride, peroxygen compound and hydrocarbon haloformate being present in amounts sufficient to generate, in the presence of said alkaline buffering reagent, an initiating amount of said initiator and thereby polymerize the ethylenically unsaturated material.

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**3,978,033**

## DIFURFURYLIDENE CYCLOALKANONES AS PHOTOACTIVE PRODEGRADANTS FOR POLYOLEFINS

**John A. Gontarz, Landenberg, and Charles H. Nelson, West Chester, both of Pa., assignors to ICI United States Inc., Wilmington, Del.**

**Filed Apr. 23, 1975, Ser. No. 570,520**

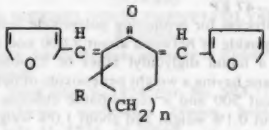
**Int. Cl.[2] C08K** *5/15;* **C08F** *8/00, 110/02*

**U.S. Cl. 526—1** **4 Claims**

1. A photodegradable composition comprising:

a. a polyolefin, and

b. a difurfurylidene cycloalkanone having the following formula:



wherein

*n* is equal to from 0 to 2, and

R is selected from the group consisting of hydrogen, branched or straight chain alkyl containing from 1 to about 10 carbon atoms, and cyclic alkyl containing from 4 to 7 carbon atoms.

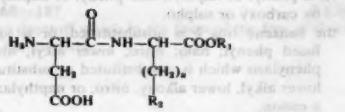
3,978,034

## L-ASPARTYL DIPEPTIDES AS SWEETENING AGENTS

John T. Sheehan, Middlesex, and Miguel A. Ondetti, North Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 12, 1969, Ser. No. 876,054
Int. Cl.² C07C *103/52*; A23L *1/22*
U.S. Cl. 260—112.5 R 4 Claims

1. A dipeptide of the formula



wherein each amino acid is of the L-configuration, *n* is an integer from 0 to 5, $R_1$ is an alkyl radical of up to 6 carbon atoms, and $R_2$ is a mono- or diunsaturated cycloalkyl radical of up to 8 carbon atoms.

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3,978,035

## 13-NORLEUCINE-14-DESAMIDO MOTILIN, A METHOD FOR PREPARING IT AND AN AGENT CONTAINING IT

Erich Wunsch, Tutzing; Gerhard Wendlberger, Taufkirchen; Ernst Jaeger, Germering; Regine Scharf, Munich; Karl-Heinz Deimer, Germering, and Hans Stocker, Prien, all of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Mar. 27, 1974, Ser. No. 455,396
Claims priority, application Germany, Mar. 27, 1973, 2315271
Int. Cl.² C07C *103/52*; A61K *37/00*
U.S. Cl. 260—112.5 R 7 Claims

1. A method for the production of 13-norleucine-14-desamido-motilin comprising:

a. forming fragment I, which consists of arginyl (hydrobromide)-asparagine-Nε-tert.butyloxycarbonyl-lysyl-glycyl-glutamine-tert.butyl ester (amino acids 18 to 22), by esterifying Nα-benzyloxycarbonyl-glutamine with acetic acid tert.butyl ester using a sulfuric acid catalysis, hydrogenolytic removing the N-protective group to form glutamine tert.butyl ester (amino acid 22), reacting the glutamine tert.butyl ester with Nα-benzyloxycarbonyl-glycine-N-hydroxy-succinimide ester (amino acid 21) and hydrogenolytically removing the N-protected group from the dipeptide ester, reacting the glycyl-glutamine-tert.butyl ester (amino acids 21 to 22) with Nα-benzyloxycarbonyl-asparaginyl-Nε-tert.butyloxycarbonyl-lysine (amino acids 19 to 20) by means of the carbodiimide-N-hydroxysuccinimide method to form benzyloxy-carbonyl-tetra-peptide ester, removing the N-protective group from the benzyloxy-carbonyl-tetra-peptide ester by means of catalytic hydrogenation, reacting the resultant asparaginyl-Nε-tert.butyloxycarbonyl-lysyl-glycyl-glutamine-tert.butyl ester (amino acids 19 to 22) with Nα-benzyloxycarbonyl-Nδ,ω-dibenzyloxycarbonyl-arginine-4-nitrophenyl ester (amino acid 18) to form Nα-benzyloxycarbonyl-Nδ,ω-dj-benzyloxycarbonyl-arginyl-asparaginyl-Nε-tert.butyloxycarbonyl-lysyl-glycyl-glutamine-tert.butyl ester, and removing the three benzylocarbonyl protective groups from the resultant ester by means of catalytic hydrogenolysis with the addition of 2 equivalents of hydrogen bromide whereby fragment I is formed;

b. forming fragment II, which consists of Nα-benzyloxycarbonyl-glutamyl- (γ-tert.butyl ester)-glutamyl-(γ-tert.butyl ester)-Nε-tert.butyloxycarbonyl-lysyl-glutamic acid-γ-tert.butyl ester (amino acids 14 to 17), by reacting Nα-benzyloxycarbonyl-Nε-tert.butyloxy-carbonyl-lysine-N-hydroxysuccinimide ester (amino acid 16) and glutaminic acid -γ-tert.butyl-α-methyl ester (amino acid 17), converting the resultant compound by alkaline ester saponification and subsequent catalytic deacylating to Nε-tert-.butyloxycarbonyl-lysyl-glutamic acid-γ-tert.butyl ester (amino acids 16 and 17), and twice, sequentially, reacting said ester with Nα-benzyloxycarbonyl-glutamic acid (γ-tert.butyl ester)-N-hydroxysuccinimide ester (amino acids 15 and 14, respectively), such respectively being a head component;

c. forming fragment III which consists of Nα-benzyloxy-carbonyl-Nδ, Nω-di-benzyloxycarbonyl-arginyl-norleucine (amino acids 12 and 13), by aminoacylating norleucin (amino acid 13) with Nα-benzyloxycarbonyl Nδ, Nω-dibenzyloxy-carbonyl-arginine-N-hydroxysuccinimide ester (amino acid 12);

d. forming fragment IV which consists of Nα-benzylocarbonyl-glutamyl-(γ-tert.butyl ester)-leucyl-glutamine (amino acids 9 to 11), by reacting leucyl-glutamine (amino acids 10 and 11) with Nα-benzyloxy-carbonyl-glutaminic acid-(γ-tert.butyl ester) N-hydroxysuccinimide ester;

e. forming fragment V which consists of 0-tert.butyl-threonyl-0-tert.butyl-tyrosyl-glycine (amino acids 6 to 8), by reacting 0-tert.-butyl-tyrosyl-glycine (amino acids 7 and 8) with Nα-benzyloxycarbonyl-0-tert.-butyl-threonine-N-hydroxysuccinimide ester (amino acid 6) and converting the compound into fragment V by catalytic hydrogenation of the N-protective group;

f. forming fragment VI which consists of Nα-tert.butyloxy-carbonyl-phenylalanyl-valyl-prolyl-isoleucyl-phenylalanine (amino acids 1 to 5), by reacting Nα-benzyloxy-carbonyl-isoleucine (amino acid 4) and phenylalanine-tert.-butyl ester (amino acid 5) using the carbodiimide method, catalytic deacylating of the resultant compound, reacting the resultant isoleucyl-phenylalanin-tert.-butyl ester (amino acids 4 and 5) with Nα-tert.-butyloxycarbonyl-valyl-proline using the carbodiimide method, whereby Nα-tert.butyloxycarbonyl valyl-prolyl-isoleucyl-phenylalanine-tert.-butyl ester is formed, converting the resultant ester by treatment with trifluoro acetic acid to valyl-prolyl-isoleucylphenylalanine (amino acids 2 to 5), and reacting the amino function with Nα-tert.butyl-oxycarbonyl-phenylalanin-N-hydroxysuccinimide ester (amino acid 1), whereby fragment VI is formed,

wherein, in fragments I to VI, all of the side chain functions of the polyfunctional amino acids have tert.butyl alcohol derived protective groups, which can acidolytically readily be removed, and the complex function of the arginine is masked either by Nδ, ω-diacylation or by protonisation by salt formation with hydrogen bromide, said fragments I to VI being separately formed, in any desired sequence or concurrently;

g. connecting fragments I to VI together by means of the N,N'-dicyclohexylcarbodiimide-N-hydroxysuccinimide method or a modification thereof;

h. removing all of the protective groups from the so-obtained polypeptide, masked on all sides and having the overall sequence of the amino acids 1 to 22, by means of tri-fluoro-acetic acid;

i. removing. the trifluoroacetate and bromide ions by means of an anion exchange resin; and

j. isolating and purifying the resultant 13-norleucine-14-desamido-motilin.

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3,978,036

## METHOD OF COLORING AND MOLDING A SHAPED THERMOPLASTIC RESIN ARTICLE

Edward T. Pollard, Vermilion, Ohio, assignor to PMS Consolidated, Somerset, N.J.

Division of Ser. No. 310,022, Nov. 28, 1972, Pat. No. 3,844,810, which is a division of Ser. No. 129,968, March 31, 1971, Pat. No. 3,728,143. This application Aug. 2, 1974, Ser. No. 494,340
Int. Cl.² B29F *1/00*
U.S. Cl. 264—140 2 Claims

1. A process for dry coloring and molding a shaped article

of a thermoplastic resin having highly developed color and the hue and intense and lustrous color comprising:

a. admixing in compounding means, while avoiding agglomeration,

i. micropulverized pigment particles having a size of 0.1 to 100 microns, and

ii. a molten fatty acid amide having amine radicals containing up to 36 carbon atoms and fatty acid radicals containing 1 to 36 carbon atoms, said fatty acid amide being solid at room temperature, and said fatty acid amide being unsubstituted or substituted by hydroxyl,

said admixing step (a) not utilizing any solvent, said admixture containing from about 10 to about 90 percent by weight of said pigment and from about 90 to about 10 percent by weight of said fatty acid amide;

b. cooling said admixture to solidification wherein each particle of said pigment is encased within said solidified fatty acid amide, said admixture being in dry form;

c. particulating said solidified admixture, particles of said solidified admixture being obtained;

d. screening said particles of said solidified admixture to remove the fines portion of said particles of said solidified admixture from said particles of said solidified admixture;

e. mixing said screened particles of said solidified admixture in dry form with uncolored thermoplastic resin particles, said mixture containing from about 0.1 of said screened particles of said solidified admixture per 100 parts of said thermoplastic resin to 100 parts of said screened particles of said solidified admixture per one part of said thermoplastic resin; and

f. injection molding said mixture (e) into a colored and shaped article by means of an injection molding machine, said injection molding step rendering said thermoplastic resin fluid so as to cause it to be flowable, whereupon said encased pigments uniformly disperses in said fluid thermoplastic resin, and subjecting said fluid thermoplastic resin having said encased pigments uniformly dispersed therein to molding pressure,

said molding step (f) not utilizing any solvent; and

g. cooling said injected molded mixture (f) until it solidifies.

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**3,978,037**

## AZO, AZOMETHINE 1:2 CHROMIUM COMPLEX DYES

**Fabio Beffa, Riehen, and Alfred Fasciati, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

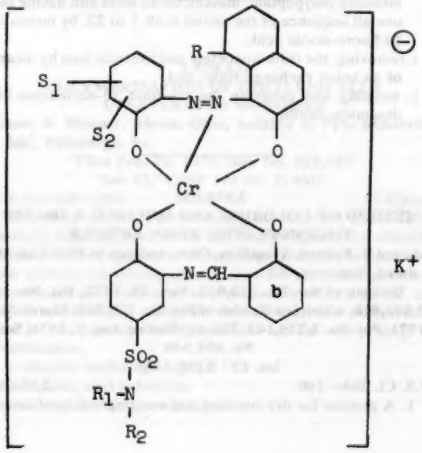
**Filed Dec. 4, 1974, Ser. No. 529,670**

**Claims priority, application Switzerland, Dec. 7, 1973, 17196/73**

**Int. Cl.[2] C09B** *45/16, 45/26, 55/00;* **D06P** *3/24*

**U.S. Cl. 260—151** **4 Claims**

1. A 1:2 chromium complex dye of the formula



wherein $S_1$ is hydrogen or $S_2$;

$S_2$ is chloro, bromo, nitro, cyano, lower alkyl, lower alkoxy, lower alkanoylamino, lower alkoxycarbonylamino, lower alkylsulfonyl, phenylsulfonyl, $-SO_2NH_2$, lower N-monoalkylsulfonamido, or lower N,N-dialkylsulfonamido;

R is hydrogen, lower alkanoylamino, lower alkoxycarbonylamino or benzoylamino;

$R_1$ is hydrogen or lower alkyl;

$R_2$ is phenyl or napthyl, said phenyl or napthyl substituted by carboxy or sulpho;

the benzene ring *b* is unsubstituted, or is substituted by fused phenyl; halo; nitro; lower alkyl; lower alkoxy; phenylazo which is unsubstituted or substituted by halo, lower alkyl, lower alkoxy, nitro; or napthylazo, and $K^+$ is a cation.

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**3,978,038**

## DISAZO PIGMENTS CONTAINING AT LEAST ONE NITRO GROUP ON THE DIAZO COMPONENT

**Georg Cseh, Basel, and Armand Roueche, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

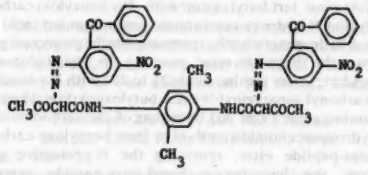
**Filed Feb. 27, 1974, Ser. No. 446,188**

**Claims priority, application Switzerland, Mar. 7, 1973, 3315/73**

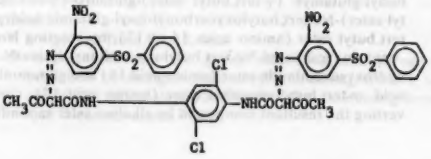
**Int. Cl.[2] C09B** *38/16;* **D06P** *1/08, 3/00*

**U.S. Cl. 260—176** **2 Claims**

1. Disazo pigment of the formula



2. Disazo pigment of the formula



## 3,978,039
## DISULPHIMIDOPHENYL-AZO-NAPHTHYL-AZO-AMINOPHENYL DYESTUFFS

**Richard Sommer, Leverkusen, and Gerhard Wolfrum, Bergisch-Neukirchen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

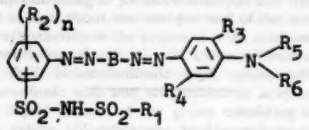
**Filed May 10, 1974, Ser. No. 468,933**

**Claims priority, application Germany, May 12, 1973, 2324067**

**Int. Cl.² C09B** *31/04, 31/08, 31/14;* **D06P** *3/24*

**U.S. Cl. 260—187** **5 Claims**

1. Disazo dyestuff which in the form of the free acid corresponds to the formula



wherein

the disulphimide group is in the ortho-, meta- or para-position relative to the azo bridge;

$R_1$ is phenyl, naphthyl, $C_1$–$C_4$-alkyl, di-$C_1$–$C_4$-alkylamino, or phenyl substituted by $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, halogen, cyano, or nitro;

$R_2$ is chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, hydroxy, substituted $C_1$–$C_4$-alkyl or substituted $C_1$–$C_4$-alkoxy where the substituent of said substituted $C_1$–$C_4$-alkyl or of said substituted $C_1$–$C_4$-alkoxy is halogen, cyano, hydroxy, or phenyl;

$R_3$ is hydrogen, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, hydroxy, phenoxy, tolyloxy, substituted $C_1$–$C_4$-alkyl, or substituted $C_1$–$C_4$-alkoxy where the substituent of said substituted $C_1$–$C_4$-alkyl or of said substituted $C_1$–$C_4$-alkoxy is halogen, cyano, hydroxy, or phenyl;

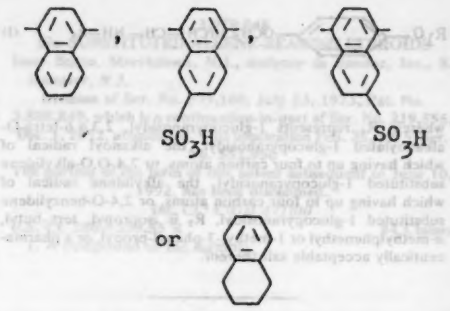
$R_4$ is hydrogen, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, formylamino, ($C_1$–$C_4$-alkyl) carbonylamino, ($C_5$–$C_7$-cycloalkyl) carbonylamino, ($C_2$–$C_4$-alkenyl) carbonylamino, benzoylamino, $C_1$–$C_4$-alkylsulfonylamino, phenylsulfonylamino, ($C_1$–$C_4$-alkoxy) carbonylamino, chloropropionylamino, hydroxyacetylamino, phenoxyacetylamino, chlorobenzoylamino, dichlorobenzoylamino, phenacetylamino, substituted $C_1$–$C_4$-alkyl, or substituted $C_1$–$C_4$-alkoxy where the substituent of said substituted $C_1$–$C_4$-alkyl or of said substituted $C_1$–$C_4$-alkoxy is halogen, cyano, hydroxy, or phenyl;

$R_5$ and $R_6$ are $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkyl substituted by halogen, cyano, hydroxy, $C_1$–$C_4$-alkoxy, phenoxy, tolyloxy, benzoyloxy, ($C_1$–$C_4$-alkyl) carbonyloxy, ($C_1$–$C_4$-alkoxy) carbonyloxy, ($C_1$–$C_4$-alkoxy) carbonyl or phenyl;

$R_5$, additionally is hydrogen;

$n$ is the number 0, 1 or 2; and

B is a radical of the formula



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## 3,978,040
## PROCESS FOR THE PREPARATION OF CYANOAZO COMPOUNDS BY REACTING HALOGENOAZO COMPOUNDS WITH CuCN IN AN AQUEOUS MEDIA IN THE PRESENCE OF A NITROGEN BASE

**Alois Gottschlich; Klaus Leverenz, both of Leverkusen, and Karl-Ludwig Moritz, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Mar. 1, 1974, Ser. No. 447,219**

**Claims priority, application Germany, Mar. 3, 1973, 2310745**

**Int. Cl.² C09B** *43/00;* **D06P** *3/52, 3/54*

**U.S. Cl. 260—205** **12 Claims**

1. In the cyano exchange process for preparing an azo compound having at least one cyano group ortho to the azo bridge by replacing an ortho halogen substituent with a cyano substituent; the improvement which comprises conducting the cyano exchange reaction at a temperature of 10°C to 110°C in an aqueous medium containing a nitrogen base and, CuCN or means for generating CuCN is situ; said nitrogen base being present in an amount of 0.05 to 5 moles per mole of CuCN; and said aqueous medium comprising water and up to 50 percent by weight of a non-basic, water-miscible organic solvent.

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## 3,978,041
## PHENOXY SUBSTITUTED GLYCOSIDES

**Knut A. Jaeggi, Basel; Herbert Schröter, Fullinsdorf, and Franz Ostermayer, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

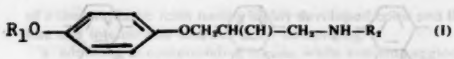
**Continuation-in-part of Ser. No. 421,558, Dec. 4, 1973, abandoned. This application Feb. 3, 1975, Ser. No. 546,648**

**Claims priority, application Switzerland, Dec. 22, 1972, 18731/72; Oct. 24, 1973, 15022/73; Feb. 8, 1974, 1775/74**

**Int. Cl.² C07H** *15/00*

**U.S. Cl. 536—4** **11 Claims**

1. A compound which is a 1-phenoxy-2-hydroxy-3-amino-propane of the formula



wherein $R_1$ represents 1-glucopyranosidyl, 2,3,4,6-tetra-O-alkanoylated 1-glucopyranosidyl, the alkanoyl radical of which having up to four carbon atoms, or 2,4-O,O-alkylidene substituted 1-glucopyranosidyl, the alkylidene radical of which having up to four carbon atoms, or 2,4-O-benzylidene substituted 1-glucopyranosidyl, $R_2$ is isopropyl, tert.-butyl, α-methylphenethyl or 1-methyl-3-phenyl-propyl, or a pharmaceutically acceptable salt thereof.

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**3,978,042**

## PROCESS FOR PREPARING CYCLOCYTIDINE DERIVATIVES

**Edward J. Hessler, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed Jan. 31, 1975, Ser. No. 546,074**

**Int. Cl.² C07H *19/02***

**U.S. Cl. 536—23** **10 Claims**

1. A process for preparing cyclocytidine tosylate salt which comprises

a. reacting D-arabinose with cyanamide or cyanide and aqueous ammonia in an inert solvent to prepare the aminooxazoline of D-arabinose

b. contacting the said aminooxazoline of Step a with cis-β-[trimethylammonium]-acrylonitrile tosylate.

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**3,978,043**

## IONIC COMPLEXES OF DOUBLE-STRANDED RIBONUCLEIC ACID

**Richard Anthony Vere-Hodge, Dorking, England, assignor to Beecham Group Limited, England**

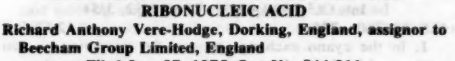
**Filed Jan. 27, 1975, Ser. No. 544,211**

**Claims priority, application United Kingdom, Jan. 29, 1974, 4207/74**

**Int. Cl.² C07H *21/02***

**U.S. Cl. 536—28** **5 Claims**

1. An antiviral substance which is a complex in which the cations are organic polymer polycations which contains a repeat unit of formula (I):



wherein *m* and *n* are the same or different and each is an integer from 3 to 5 and the anions are either (a) double-stranded ribonucleic acid polyanions, said double-stranded ribonucleic acid being of natural origin or (b) polyanions of a double-stranded N-oxide or alkali-modified derivative of a double-stranded ribonucleic acid of natural origin.

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**3,978,044**

## INDAZOLE DERIVATIVES, PROCESSES FOR MAKING THE SAME AND PHARMACEUTICAL COMPOSITIONS

**Michel Vincent, Bagneux, and Georges Remond, Versailles, both of France, assignors to Science Union et Cie, Neuilly, France**

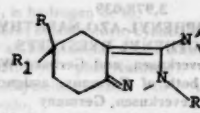
**Filed Apr. 22, 1975, Ser. No. 570,937**

**Claims priority, application United Kingdom, May 2, 1974, 19239/74**

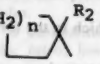
**Int. Cl.² C07D *231/56, 277/24, 213/18;* C13K *13/00***

**U.S. Cl. 536—117** **7 Claims**

1. A 3-amino 4, 5, 6, 7 - tetrahydroindazoles of the formula



wherein R is hydrogen and $R_1$ is cycloalkyl of the formula



wherein

*n* is an integer of 1 to 4 and

$R_2$ is hydrogen, $R^1$ is phenyl, $R''$ is hydrogen or lower alkyl and $R'''$ is selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower alkynyl and phenyl wherein lower alkyl contains 1 – 6 carbon atoms, lower alkenyl contains 2 – 10 carbon atoms and lower alkynyl contains 2 – 6 carbon atoms and the therapeutically compatible mineral or organic acid addition salts.

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**3,978,045**

## $N^3$-DANSYL-L-ARGININE DERIVATIVES, AND THE PHARMACEUTICALLY ACCEPTABLE ACID ADDITION SALTS THEREOF

**Shosuke Okamoto, Kobe; Ryoji Kikumoto, Tokyo; Yoshikuni Tamao, Yokohama; Shinji Tonomura, and Kazuo Ohkubo, both of Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan**

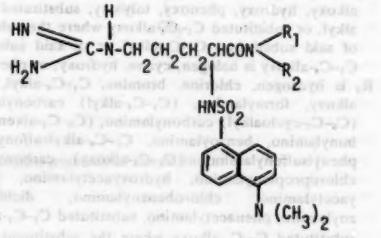
**Filed Aug. 13, 1974, Ser. No. 496,939**

**Claims priority, application Japan, Aug. 13, 1973, 48-090699; Oct. 16, 1973, 48-116035; Oct. 18, 1973, 48-117292; Dec. 10, 1973, 48-137501; Mar. 19, 1974, 49-031141; Mar. 25, 1974, 49-033260; May 31, 1974, 48-061573**

**Int. Cl.² C07D *225/02***

**U.S. Cl. 260—239 B** **14 Claims**

1. $N^3$-dansyl-L-arginine esters and amides having the formula



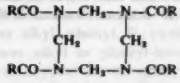
or the acid addition salts thereof with a pharmaceutically acceptable acid, wherein $R_1$ and $R_2$ are members selected from the group consisting of hydrogen and a hydrocarbon selected from the group consisting of alkyl, aryl, aralkyl, cycloalkyl, cycloalkylalkyl, wherein said member contains not more than 10 carbon atoms, or $R_1$ and $R_2$ together is polymethyleneiminyl or 3–10 carbon atoms, optionally substituted by one or two alkyl groups of not more than 10 carbon atoms.

## 3,978,046
## PREPARATION OF OCTAHYDRO-1,3,5,7-TETRAALKANOYL-1,3,5,7-TETRAZOCINES

Clifford L. Coon, Fremont, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 4, 1975, Ser. No. 546,859
Int. Cl.² C07D 257/02
U.S. Cl. 260—239 BC 5 Claims

1. A process for preparing an octahydro-1,3,5,7-tetraalkanoyl-1,3,5,7-tetrazocine compound of the formula:



wherein R is an unsubstituted alkyl radical of 1 to 2 carbon atoms, which comprises the step of reacting a methylene-bis-alkanecarboxamide of the formula $CH_2(NHCOR)_2$ wherein R has the foregoing definition, with a polymeric formaldehyde of the group consisting of paraformaldehyde and trioxane, in an amount at least about one mol per mol of the methylene-bis-alkanecarboxamide in the presence of an acid catalyst of the group consisting of sulfuric acid, chlorosulfonic acid, hydrochloric acid, benzenesulfonic acid, toluenesulfonic acid, methanesulfonic acid and trifluoroacetic acid and an inert organic liquid diluent of the group consisting of benzene, toluene, xylene, chlorobenzene, trichloroethane and ethylene dichloride at a temperature within the range of 75°C. and 135°C., and removing the water as it is formed in the reaction by azeotropic distillation with the organic liquid.

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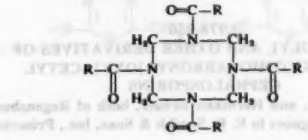
## 3,978,047
## SUBSTITUTED TETRAZOCINES AND PROCESS THEREFOR

Edward B. Hodge, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Continuation-in-part of Ser. No. 382,268, July 24, 1973, abandoned, which is a division of Ser. No. 141,973, May 10, 1971, abandoned. This application Feb. 19, 1975, Ser. No. 551,174
Int. Cl.² C07D 257/02
U.S. Cl. 260—239 BC 2 Claims

1. A compound of the formula



wherein R is ethyl.

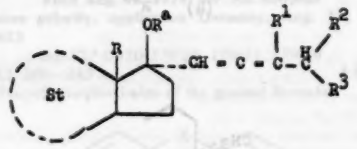
2. A method for the preparation of the compound of claim 1 by reacting hexamethylene tetramine with propionic anhydride in a mole ratio of 1:2–10.

## 3,978,048
## 17α-SUBSTITUTED-ALLENE-BEARING STEROIDS

Imre Bacso, Morristown, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 379,160, July 13, 1973, Pat. No. 3,888,849, which is a continuation-in-part of Ser. No. 219,555, Dec. 1, 1972, abandoned. This application Feb. 25, 1975, Ser. No. 552,956
The portion of the term of this patent subsequent to June 10, 1992, has been disclaimed.
Int. Cl.² C07D 471/00
U.S. Cl. 260—239.55 R 44 Claims

1. A compound of the formula



wherein R is alkyl having from 1 to 4 carbon atoms;

$R^a$ is a hydrogen atom, or the residue of a hydrolyzable ether or ester;

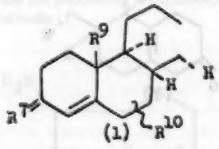
$R^1$ is a hydrogen atom or alkyl having from 1 to 6 carbon atoms,

$R^2$ is a hydrogen atom or alkyl having from 1 to 8 carbon atoms,

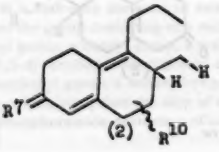
$R^3$ is a hydrogen atom, alkyl having from 1 to 8 carbon atoms, phenyl, or phenyl having one or two substituents, independently, from the group of fluoro or alkyl having from 1 to 6 carbon atoms; or

$R^1$ and $R^3$ may be joined so as to form a polymethylene bridge having from 3 to 12 carbon atoms; and

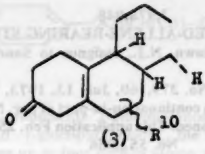
St is a gonene residue selected from the group consisting of:



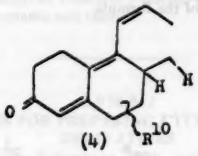
(1)



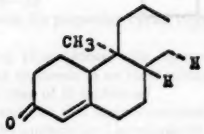
(2)



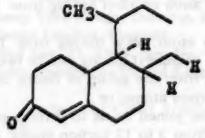
(3)



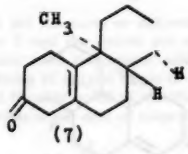
(4)



(5)

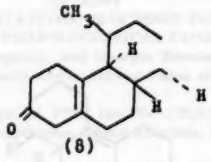


(6)



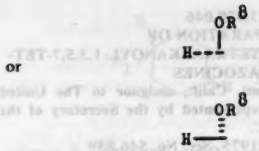
(7)

and



(8)

wherein $R^7$ is oxo or



or



$R^8$ is a hydrogen atom, a hydrolyzable ether or ester residue;
$R^9$ is a hydrogen atom or methyl; and
$R^{10}$ is a hydrogen atom, 6α-methyl or 7α-methyl, provided that when any of $R^2$ and $R^3$ is a hydrogen atom or alkyl, $R^1$ is a hydrogen atom and the total number of carbon atoms in $R^2$ and $R^3$ does not exceed 4, then St is not of type (2).

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**3,978,049**

## PROCESS FOR THE PREPARATION OF HYDRAZINE COMPOUNDS

**Jean-Pierre Schirmann, Brignais; Pierre Tellier, Oullins; Henri Mathais, Meudon, and Francis Weiss, Rethondes, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

**Filed Jan. 16, 1974, Ser. No. 433,710**
**Claims priority, application France, Feb. 9, 1973, 73.04633**
**Int. Cl.[2] C07C *109/00***
**U.S. Cl. 260—240 G** **5 Claims**

1. A method of preparing an azine or a mixture of an azine and a hydrazone which comprises reacting a carbonyl compound selected from formaldehyde, acetaldehyde, propionaldehyde, butyraldehyde, isobutyraldehyde, n-pentanal, pivalaldehyde, oenanthal, 2-ethyl-hexanal, Δ-3-tetrahydrobenzaldehyde, hexahydrobenzaldehyde, 5-norbornene-2-carboxaldehyde, tetrahydropyran-2-carboxaldehyde, benzaldehyde, a monochlorobenzaldehyde, p-nitrobenzaldehyde, β-chloropropionaldehyde, β-methoxy-propionaldehyde, 4-cyano-2,2-dimethyl-butyraldehyde, acetone, 2-butanone, 2-pentanone, 3-pentanone, methylisopropyl ketone, methylcyclohexylketone, acetophenone, benzophenone, cyclobutanone, cyclopentanone, cyclohexanone, 2-methyl-cyclohexanone, 3-methylcyclohexanone, 3,3,5-trimethyl-cyclohexanone and isophorone, with ammonia or with ammonia and an amine, respectively, wherein the amine is selected from methylamine, dimethylamine, ethylamine, diethylamine, n-propylamine, isopropylamine, n-butylamine, di-n-butylamine, t-butylamine, an amylamine, cyclohexylamine, dicyclohexylamine, n-dodecylamine, mono and diethanolamines, 2-methoxyethylamine, morpholine, pyrrolidine, piperidine, β-aminopropionitrile, β-aminopropionamide, aniline, a toluidine, mono and dichloro anilines, mono and dichloro toluidines, a bromoaniline, a fluoroaniline, nitro and dinitroanilines, nitro and dinitrotoluidines, an anisidine, a trifluoromethylanisidine, a trifluoromethylaniline, anthranilic acid, sulphanilic acid, diphenylamine, a napthylamine, and an aminopyridine, in the presence of hydrogen peroxide and a catalytic amount of selenium or a compound of selenium selected from selenium dioxide, selenious acid, the alkali and alkali earth selenites, selenium trioxide, selenic acid, and alkali and alkali earth selenates.

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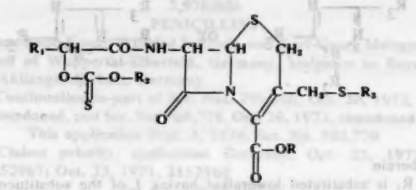
**3,978,050**

## 3-TETRAZOLYL AND OTHER DERIVATIVES OF [[(ALKOXY)THIOCARBONYL]OXY]ACETYL CEPHALOSPORINS

**Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Jan. 24, 1975, Ser. No. 544,031**
**Int. Cl.[2] C07D *501/36***
**U.S. Cl. 260—243 C** **10 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, tri(lower alkyl)stannyl, tri(lower alkyl)silyl, $-CH_2OCO-R_4$, alkali metal, alkaline earth metal or lower alkylamine; $R_1$ is hydrogen, lower alkyl, phenyl, $R_3$-pyridyl, $R_3$-thienyl or $R_3$-furyl; $R_2$ is lower alkyl or phenyl-lower alkyl; $R_3$ is a five membered herterocyclic of the group $R_3$-thiadiazole, thiatriazole, $R_3$-tetrazole, $R_4$ is lower alkyl, phenyl or phenyl-lower alkyl; and $R_5$ is hydrogen or lower alkyl.

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**3,978,051**

**7-METHOXY 7-α-UREIDOTHIENYLACETAMIDOCEPHALOSPORINS**

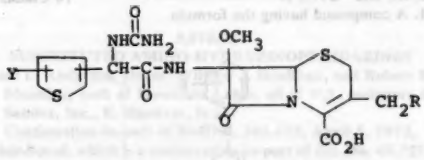
**Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Aug. 23, 1973, Ser. No. 390,838**

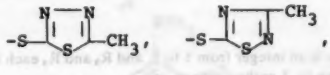
**Int. Cl.² C07D** *501/36*

**U.S. Cl. 260—243 C** **11 Claims**

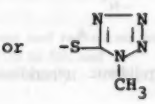
**1.** A compound of the formula:



wherein the 7-methoxy group occupies the α-configuration; R is



or



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**3,978,052**

**PHENOTHIAZINE-S-OXIMIDE COMPOUNDS**

**Peter Stoss, Wildtal, and Gerhard Satzinger, Denzlingen, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.**

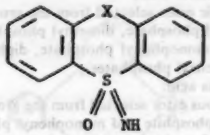
**Filed Aug. 12, 1974, Ser. No. 496,600**

**Claims priority, application Germany, Aug. 17, 1973, 2341653**

**Int. Cl.² C07D** *279/20, 279/22, 279/30*

**U.S. Cl. 260—243 A** **4 Claims**

**1.** Tricyclic sulphoximide of the general formula:



wherein X is an unsubstituted or substituted imino group wherein the substituted imino group is an imino group substituted by an alkyl radical containing up to 4 carbon atoms or alkylcarbonyl containing up to 4 carbon atoms, and the pharmacologically compatible salts thereof.

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**3,978,053**

**PROCESS FOR PRODUCING CEPHALOSPORINS**

**Noritaka Hanma, Sakai; Masataka Fukumura, Toyonaka; Kaoru Maeshima, Takarazuka, and Takenari Nakagome, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

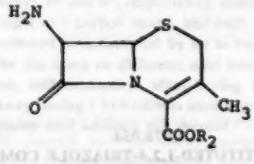
**Filed Nov. 29, 1974, Ser. No. 528,313**

**Claims priority, application Japan, Nov. 29, 1973, 48-135056**

**Int. Cl.² C07D** *501/02*

**U.S. Cl. 260—243 C** **22 Claims**

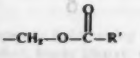
**1.** A process for producing a cephalosporanic acid derivative of the formula (I)



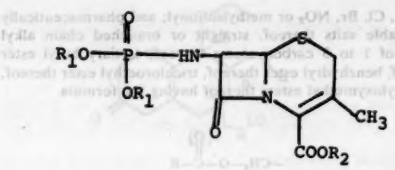
(I)

wherein $R_2$ is a hydrogen atom or an ester protective group selected from the group consisting of a methyl group, a 2,2,2-trichloroethyl group, a benzyl group, a p-nitrobenzyl group, a 4-methoxy-3,5-di-tert-butylbenzyl group, a phenacyl group, a methyl sulfonylethyl group, a benzhydryl group and a trimethylsilyl group, which comprises the step of reacting at about 0° to 100°C a phosphoramide derivative of cephalosporin of the formula (II)

Y is H, Cl, Br, $NO_2$ or methylsulfonyl; and pharmaceutically acceptable salts thereof, straight or branched chain alkyl esters of 1 to 3 carbon atoms thereof, tertiary butyl ester thereof, benzhydryl ester thereof, trichloroethyl ester thereof, and acyloxymethyl esters thereof having the formula



wherein R′ is lower alkyl of 1 to 5 carbon atoms, phenyl, benzyl or phenethyl.



(II)

wherein $R_1$ is a lower alkyl group having 1 to 4 carbon atoms and $R_2$ is as defined above, with a phosphorus acid selected from the group consisting of:

a. orthophosphoric acid;
b. a phosphoric ester selected from the group consisting of monomethyl phosphate, dimethyl phosphate, monoethyl phosphate, monophenyl phosphate, diphenyl phosphate and monobenzyl phosphate;
c. phosphorous acid;
d. a phosphorous ester selected from the group consisting of monoethyl phosphite and monophenyl phosphite;
e. a phosphoric acid anhydride selected from the group consisting of pyrophosphoric acid, polyphosphoric acid and phosphorus pentoxide;
f. a phosphoric ester anhydride selected from the group consisting of dimethyl pyrophosphate, diphenyl pyrophosphate and polyphosphoric ester;
g. a phosphonic acid selected from the group consisting of methylphosphonic acid and phenylphosphonic acid;
h. a phosphinic acid selected from the group consisting of dimethylphosphinic acid and diphenylphosphinic acid; and
i. polyphosphoric acid wherein said reacting is in a mixture of said derivative of the formula (II) and said phosphorus acid or in a solution or suspension in an inert solvent of said derivative of the formula (II) and said phosphorus acid.

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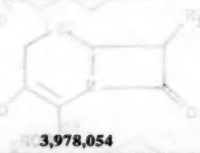


**3,978,054**

**1,3,5-TRISUBSTITUTED-1,2,4-TRIAZOLE COMPOUNDS**

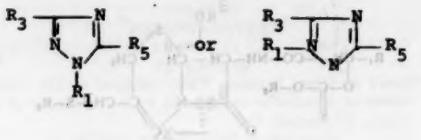
**John J. Baldwin, Lansdale, and Frederick C. Novello, Berwyn, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Division of Ser. No. 527,992, Nov. 29, 1974, Pat. No. 3,928,361, which is a division of Ser. No. 361,914, May 21, 1973, Pat. No. 3,882,134. This application July 28, 1975, Ser. No. 599,504**

**Int. Cl.² C07D** *401/14, 413/14*

**U.S. Cl. 260—247.5 E** **4 Claims**

**1. A compound of the formula**



wherein

$R_1$ is substituted loweralkyl having 1 of the substituents piperidino, morpholino;
$R_2$ is pyridyl; and
$R_3$ is pyridyl.

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**3,978,055**

**ARYLAMINO PYRIMIDINIC DERIVATIVES**

**Claude P. Fauran, Paris; Guy R. Bourgery, Colombes; Guy M Raynaud, Paris, and Claude J. Gouret, Meudon, all of France, assignors to Delalande S.A., Courbevoie, France**

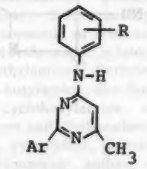
**Filed Sept. 3, 1974, Ser. No. 502,285**

**Claims priority, application France, Sept. 20, 1973, 73.33831; Mar. 26, 1974, 74.10327**

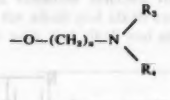
**Int. Cl.² C07D** *239/42*

**U.S. Cl. 260—247.5 D** **10 Claims**

**1. A compound having the formula**



wherein Ar is phenyl or phenyl substituted by a halogen, or a trifluoromethyl, or a methylenedioxy, or one or more methoxy, or an alkyl having one to 4 carbon atoms or a dimethylamino, and wherein R is



wherein $n$ is an integer from 1 to 5, and $R_3$ and $R_4$ each is alkyl having one to 3 carbon atoms, or

is morpholino, pyrrolidino, piperidino or hexamethyleneimino.

3,978,056

## PENICILLINS

Hans-Bodo Konig; Wilfried Schrock, and Karl-Georg Metzger, all of Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

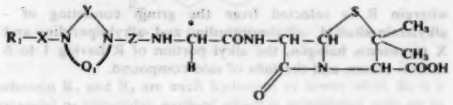
Continuation-in-part of Ser. Nos. 299,246, Oct. 20, 1972, abandoned, and Ser. No. 300,776, Oct. 20, 1972, abandoned. This application Sept. 3, 1974, Ser. No. 502,770

Claims priority, application Germany, Oct. 23, 1971, 2152967; Oct. 23, 1971, 2152968

Int. Cl.² C07D *499/46*

U.S. Cl. 260—239.1 32 Claims

1. A compound selected from the group consisting of a penicillin of the formula



wherein the carbon atom designated by * constitutes a center of chirality;

X is —CO—, —CS— or —$SO_2$—;

each of Y and Z, independently of the other, is —CO— or —CS—;

B is thienyl, cyclohexenyl, cyclohexa-1,4-dien-1-yl, phenyl or phenyl substituted by one or two members selected from the group consisting of halo, nitro, hydroxy, methoxy, methylthio and alkyl of 1 to 5 carbon atoms;

$Q_1$ is ethylene or trimethylene unsubstituted or substituted by one or two methyl groups; and

$R_1$ is an amino group selected from the group consisting of $H_2N$—, RHN— and $(R)_2N$— wherein R is alkyl of 1 to 5 carbon atoms; and the pharmaceutically acceptable salts thereof.

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3,978,057

## SUBSTITUTED AMINO-HYDRAZINOPYRIDAZINES

Paul L. Anderson, Dover; William J. Houlihan, and Robert E. Manning, both of Mountain Lakes, all of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

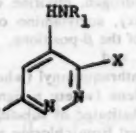
Continuation-in-part of Ser. No. 241,412, April 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 40,727, May 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 868,569, Oct. 22, 1969, abandoned, which is a continuation-in-part of Ser. Nos. 788,064, Dec. 30, 1968, abandoned, Ser. No. 845,043, July 25, 1969, abandoned, Ser. No. 847,471, Aug. 4, 1969, abandoned, and Ser. No. 860,048, Sept. 22, 1969, abandoned. This application May 2, 1974, Ser. No. 466,372

The portion of the term of this patent subsequent to Aug. 10, 1988, has been disclaimed.

Int. Cl.² C07D *237/20*

U.S. Cl. 260—250 A 16 Claims

1. A compound of the formula:



where

each X is the same and represents halo of atomic weight between about 35 to 80, and

$R_1$ represents lower alkenyl, $-(CH_2)_mOH$, wherein $m$ is 2, 3, or 4, or

where

$R_4$ represents hydrogen or halo having an atomic weight of 19 to 36, lower alkyl, lower alkoxy, or trifluoromethyl.

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3,978,058

## PYRIMIDO[1,2-a][1,5]BENZODIAZACINE DERIVATIVES

Yutaka Kuwada; Hideaki Natsugari, and Kanji Meguro, all of Hyogo, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

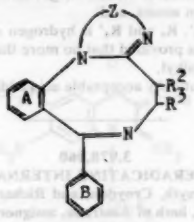
Filed Dec. 15, 1972, Ser. No. 315,313

Claims priority, application Japan, Dec. 24, 1971, 46-2722; Nov. 18, 1972, 47-115761

Int. Cl.² C07D *487/04*

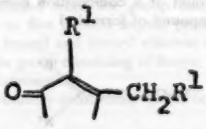
U.S. Cl. 260—256.4 F 15 Claims

1. A compound of the formula



wherein

stands for the partial structure



wherein $R^1$ stands for hydrogen, alkyl having 1 to 6 carbon atoms, or phenyl, $R^2$ and $R^3$, respectively, stand for hydrogen or alkyl having 1 to 3 carbon atoms, and each of rings A and B are unsubstituted or substituted by up to two substituents, which may be the same or different, said substituents being halogen, nitro, trifluoromethyl, alkyl having 1 to 4 carbon atoms, or alkoxy having 1 to 4 carbon atoms, or a pharmaceutically acceptable acid addition salt thereof.

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3,978,059

## CYCLIC SUBSTITUTED TRICYCLIC QUINAZOLINONES

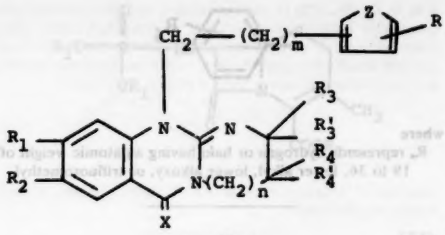
Goetz E. Hardtmann, Florham Park, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Nov. 6, 1972, Ser. No. 304,109

Int. Cl.² C07D *487/04*

U.S. Cl. 260—256.5 R 7 Claims

1. A compound of the formula:



wherein

each of $R_1$ and $R_2$ is, independently, hydrogen, halo of atomic weight not greater than 36 or alkyl of 1 to 3 carbon atoms, or both are alkoxy of 1 to 2 carbon atoms; or one is hydrogen and the other bromo or alkoxy of 1 to 2 carbon atoms,

*n* is O, 1 or 2,

*m* is O, 1 or 2,

Z is oxygen or sulfur,

X is oxygen or sulfur,

R is hydrogen, halo of atomic weight of 18 to 36 or alkyl of 1 to 4 carbon atoms, and

each of $R_3$, $R_3'$, $R_4$ and $R_4'$ is hydrogen or alkyl of 1 to 3 carbon atoms provided that no more than 3 of $R_3$, $R_3'$, $R_4$ and $R_4'$ are alkyl,

or a pharmaceutically acceptable acid addition salt thereof.

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**3,978,060**

**METHOD OF ERADICATING INTERNAL PARASITES**

**Bruce Adam Forsyth, Croydon, and Richard Burridge Warner, Ringwood, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia**

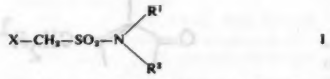
**Filed Sept. 27, 1974, Ser. No. 510,124**

**Claims priority, application Australia, Oct. 15, 1973, 5252/73; Nov. 13, 1973, 5637/73; Nov. 27, 1973, 5787/73**

**Int. Cl.² A61K** *31/425*

**U.S. Cl. 424—270** **10 Claims**

1. A method for treating warm blooded animals to eradicate *Fasciola sp* and *Haemonchus contortus;* which method comprises administering internally to said warm blooded animals an effective amount of a composition comprising as active ingredient a compound of formula I



I

wherein X is halogen, and $R^1$ and $R^2$ which may be the same or different are selected from the group consisting of hydrogen and alkyl of from 1 to 6 carbon atoms.

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**3,978,061**

**KERATIN FIBER DYE COMPOUNDS**

**Gregoire Kalopissis, Paris; Andrée Bugaut, Boulogne-sur-Seine, and Vahan Zorayan, Enghein-les-Bains, all of France, assignors to L'Oreal, Paris, France**

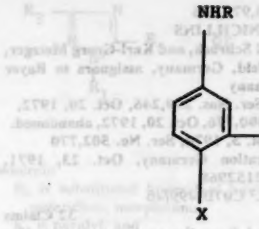
**Division of Ser. No. 78,923, Oct. 7, 1970, Pat. No. 3,742,048, which is a division of Ser. No. 728,750, May 13, 1968, Pat. No. 3,617,164. This application Apr. 20, 1973, Ser. No. 352,995**

**Claims priority, application Luxemburg, May 16, 1967, 53676; May 16, 1967, 53677; May 16, 1967, 53678**

**Int. Cl.² C07C** *87/60;* **C07D** *295/12*

**U.S. Cl. 260—570.5 P** **2 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of -alkylaminodialkyl, -alkylmorpholino and -alkylpiperidino and X represents halogen, the alkyl portion of R having 1 to 6 carbon atoms, and the salts of said compound.

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**3,978,062**

**ACRIDONE COMPOUNDS**

**Rodolf Altiparmakian, Binningen, and Hans Bohler, Rheinfelden, AG, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

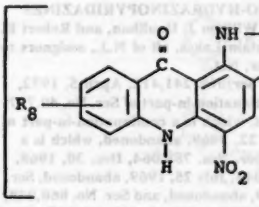
**Filed Jan. 9, 1974, Ser. No. 432,054**

**Claims priority, application Switzerland, Jan. 16, 1973, 562/73; Apr. 16, 1973, 5408/73**

**Int. Cl.² C09B** *15/00, 1/16*

**U.S. Cl. 260—276** **7 Claims**

1. A compound of formula Ia',



Ia'

in which $R_3'$ signifies a hydrogen, chlorine or bromine atom,

$R_8$ signifies a hydrogen, chlorine or bromine atom or a methyl, methoxy, acetylamino or nitro radical and is bound in one of the $\beta$-positions,

*n* signifies 1 or 2, and

$R_9$ signifies an anthraquinonyl (where *n* signifies 1) or an anthraquinonylene (where *n* signifies 2) radical, which radical is unsubstituted or substituted by up to two substituents selected from chlorine and bromine atoms and methoxy, ethoxy, methylamino, phenylamino and benzoylamino radicals,

with the proviso that when $R_3'$ and $R_8$ both signify hydrogen and *n* signifies 1, $R_9$ signifies other than an unsubstituted 1-anthraquinonyl radical.

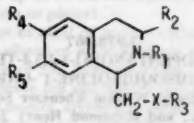
3,978,063

## 1,2,3,4-TETRAHYDROISOQUINOLINE DERIVATIVES AND THE PREPARATION THEREOF

Teiji Kishimoto, Kawanishi; Hiromu Kochi, Sakai, and Yoshiyuki Kaneda, Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed July 19, 1974, Ser. No. 489,993
Claims priority, application Japan, July 30, 1973, 48-85987
Int. Cl.[2] C07D 401/12, 491/04
U.S. Cl. 260—286 R 11 Claims

1. A 1,2,3,4-Tetrahydroisoquinoline having the formula:



wherein $R_1$ and $R_2$ are each hydrogen or lower alkyl, $R_3$ is a triazolyl or tetrazolyl, each of which is substituted with up to one lower alkyl group, $R_4$ and $R_5$ are each hydroxy or a protected hydroxy, wherein the hydrogen atom is replaced by a member selected from the group consisting of acyl, lower alkyl, allyl, aryl, ar(lower) alkyl tetrahydropyranyl, methoxymethyl, 2-nitrophenylthio, 2, 4-dinitrophenylthio, and the combination wherein $R_4$ and $R_5$ together form a lower alkylenedioxy group, and X is —O— or —S—, and pharmaceutically acceptable salts thereof, wherein "lower" refers to 1–6 carbon atom(s), aryl refers to phenyl, tolyl, xylyl, or naphthyl and acyl refers to benzyloxycarbonyl, 4-nitrobenzyloxycarbonyl, 4-bromobenzyloxycarbonyl, 4-methoxybenzyloxycarbonyl, 3,4-dimethoxybenzyloxycarbonyl, 4-(phenylazo)benzyloxycarbonyl, 4-(4-methoxyphenylazo) benzyloxycarbonyl, tertiary-butoxycarbonyl, 1,1-dimethylpropoxycarbonyl, isopropoxycarbonyl, diphenylmethoxycarbonyl, 2-pyridylmethoxycarbonyl, 2,2,2-trichloroethoxycarbonyl, 2,2,2-tribromoethoxycarbonyl, 3-iodopropoxycarbonyl, 2-fufurylloxycarbonyl, 1-adamantyloxycarbonyl, 1-cyclopropylethoxycarbonyl, 8-quinolyloxycarbonyl, methanesulfonyl, benzenesulfonyl, p-toluenesulfonyl, formyl, acetyl, benzoyl, toluoyl, phenylacetyl, trifluoracetyl or phenoxyacetyl.

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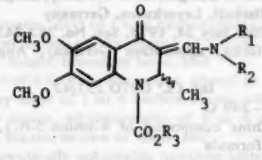
3,978,064

## 3-AMINOMETHYLENE-6,7-DIMETHOXY-2-METHYL-4-OXO-1,2,3,4-TETRAHYDRO-1-QUINOLINE CARBOXYLIC ACID ESTERS AND INTERMEDIATES LEADING THERETO

Michael R. Johnson, Gales Ferry, and Jacob J. Plattner, East Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,808
Int. Cl.[2] C07D 215/12
U.S. Cl. 260—287 K 14 Claims

1. A racemic compound selected from the group consisting of

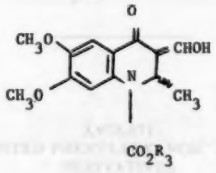


wherein

$R_1$ taken separately is selected from the group consisting of hydrogen and methyl;

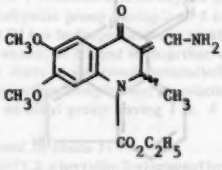
$R_2$ taken separately is selected from the group consisting of hydrogen, alkyl having from one to five carbon atoms, propargyl, phenyl, naphthyl, phenylalkylene wherein said alkylene has from one to four carbon atoms, naphthylalkylene wherein said alkylene has from one to four carbon atoms, dimethylaminoalkylene wherein said alkylene has from two to four carbon atoms and mono-substituted 2-ethyl wherein said substituent is selected from the group consisting of methoxy and phenoxy; $R_3$ is selected from the group consisting of alkyl having from one to five carbon atoms, phenyl, benzyl and mono-substituted benzyl and phenyl wherein said substituent is selected from the group consisting of fluoro, chloro, methyl, methoxy and trifluoromethyl; and the pharmaceutically acceptable acid addition salts thereof wherein $R_2$ is said dimethylaminoalkylene.

11. A racemic compound of the formula



wherein $R_3$ is selected from the group consisting of alkyl having from one to five carbon atoms, phenyl, benzyl and mono-substituted benzyl and phenyl wherein said substituent is selected from the group consisting of fluoro, chloro, methyl, methoxy and trifluoromethyl.

14. The dextrorotatory enantiomer of the compound of the formula



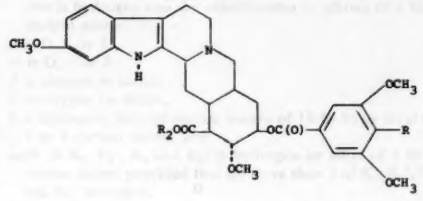
3,978,065

## RESERPINE DERIVATIVES

Emilio Occelli; Luigi Fontanella, and Giangiacomo Nathansohn, all of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed May 24, 1974, Ser. No. 473,024
Claims priority, application United Kingdom, May 25, 1973, 25158/73
Int. Cl.² C07D 459/00
U.S. Cl. 260—287 A 6 Claims

1. A compound of the formula



wherein R is selected from hydrogen, $C_{1-6}$ alkyl, $C_{3-6}$ alkenyl and $C_{2-4}$ alkanoyl; and $R_2$ is selected from hydrogen and $C_{1-6}$ alkyl.

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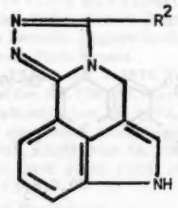
3,978,066

## CERTAIN 4,6-DIHYDROPYRROLOTRIAZOLINE-QUINOLINE DERIVATIVES

Adolf H. Philipp; Christopher A. Demerson, both of Montreal, and Leslie G. Humber, Dollard des Ormeaux, all of Canada, assignors to Ayerst, McKenna and Harrison Ltd., Montreal, Canada

Division of Ser. No. 413,418, Nov. 6, 1973, Pat. No. 3,900,477.
This application May 19, 1975, Ser. No. 578,599
Int. Cl.² C07D 471/16
U.S. Cl. 260—288 CF 3 Claims

1. A compound of the formula



in which $R^2$ is hydrogen or methyl.

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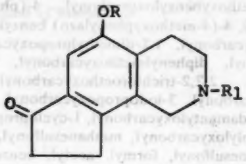
3,978,067

## 7,8-CYCLOPENTANO[h]-1,2,3,4-TETRAHYDROISOQUINOLINE-1'-ONES

Ian William Mathison; William Ebenezer Solomons, both of Memphis, Tenn., and Raymond Henry Jones, Northport, N.Y., assignors to Marion Laboratories, Inc., Kansas City, Mo.

Filed Mar. 28, 1974, Ser. No. 455,600
Int. Cl.² C07D 217/04
U.S. Cl. 260—289 C 2 Claims

1. A compound of the formula



wherein R and $R_1$ are the same or different lower alkyl groups, and acid addition salts thereof.

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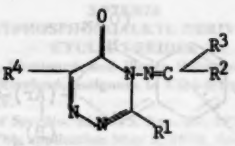
3,978,068

## AZOMETHINE COMPOUNDS OF 4-AMINO-5-H-1,2,4-TRIAZIN-5-ONES AND HERBICIDAL COMPOSITIONS CONTAINING THEM

Karlfried Dickore, Leverkusen; Wilfried Draber; Helmut Timmler, both of Wuppertal; Ludwig Eue, and Robert R. Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 24, 1973, Ser. No. 382,243
Claims priority, application Germany, Aug. 3, 1972, 2238206
Int. Cl.² C07D 251/42
U.S. Cl. 260—240 G 26 Claims

1. Azomethine compound of 4-amino-5-H-1,2,4-triazine-5-one of the formula



in which:

$R^1$ is alkyl of up to 20 carbon atoms, cycloalkyl of 3 to 6 carbon atoms or phenyl,

$R^2$ is hydrogen or alkyl of up to 4 carbon atoms,

$R^3$ is alkyl or alkoxy of up to 4 carbon atoms, cycloalkyl or cycloalkenyl of 5 to 7 carbon atoms, aralkyl with 6 to 10 carbon atoms in the aryl moiety and 1 or 2 carbon atoms in the alkyl moiety, aryl or aryl substituted with alkyl with up to 3 carbon atoms, chlorine, nitro or trifluoromethyl; or furyl, thienyl or pyrryl or $R^3$ is dialkylamino wherein each alkyl moiety, independently of the other, contains 1 to 4 carbon atoms, or represents furyl or thienyl or

$R^2$ and $R^3$ jointly represent an alkylene bridge of 2 to 6 carbon atoms which can be interrupted by oxygen, sulfur, or NH and

$R^4$ represents alkyl with up to 4 carbon atoms, phenyl or substituted phenyl substituted once or twice by halogen, straight-chain or branched alkyl with 1 to 4 carbon atoms, halomethyl with 1 to 3 halogen atoms, alkoxy or alkylthio with 1 to 4 carbon atoms, sulfonylalkyl, or nitro.

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**3,978,069**

## PHENYL-IMIDAZOLYL-FATTY ACID DERIVATIVES

**Karl Heinz Büchel; Werner Meiser; Manfred Piempel, and Carl Metzger, Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Germany**

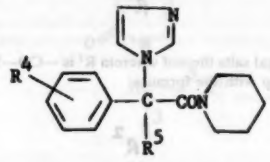
**Division of Ser. No. 38,531, May 18, 1970, Pat. No. 3,732,242. This application Aug. 24, 1972, Ser. No. 283,327**

**Claims priority, application Germany, May 21, 1969, 1925994**

**Int. Cl.² C07D 401/02**

**U.S. Cl. 260—293.7** **2 Claims**

1. A compound selected from the group consisting of a phenyl-imidazolyl carboxylic acid derivative of the formula:



wherein

$R^4$ is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylmercapto of 1 to 4 carbon atoms, chloro, fluoro, bromo or nitro; and

$R^5$ is alkyl of 1 to 8 carbon atoms, phenyl or phenyl substituted by alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylmercapto of 1 to 4 carbon atoms, chloro, fluoro, bromo or nitro, and

the pharmaceutically acceptable nontoxic salts thereof.

**3,978,070**

## BIS-2,6-[N-(α-BENZOYLTHIOPROPIONYL)GLYCYLOXYMETHYL]PYRIDINE

**Aldo Bertelli, Milan, Italy, assignor to Rorer Italiana S.p.A., Milan, Italy**

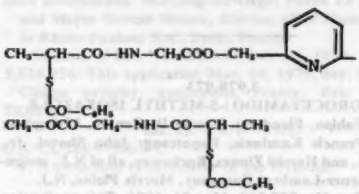
**Filed Sept. 9, 1975, Ser. No. 611,693**

**Claims priority, application France, Sept. 19, 1974, 74.31623**

**Int. Cl.² C07D 213/56**

**U.S. Cl. 260—294.8 G** **1 Claim**

1. A compound selected from the group consisting of bis-2,6-[N-(α-benzoylthiopropionyl)glycyloxymethyl]pyridine having the formula:



and its pharmaceutically acceptable acid addition salts.

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**3,978,071**

## SUBSTITUTED PHENYLALKANOIC ACIDS AND DERIVATIVES

**Michio Nakanishi; Tomio Muro, both of Nakatsu; Tohru Nakao, and Kiyoshi Ogawa, both of Yoshitomi. all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan**

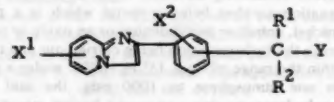
**Filed July 8, 1974, Ser. No. 486,728**

**Claims priority, application Japan, July 7, 1973, 48-76944; July 21, 1973, 48-81380; Sept. 13, 1973, 48-104094; Mar. 22, 1974, 49-32898; Mar. 27, 1974, 49-35007**

**Int. Cl.² C07D 471/04**

**U.S. Cl. 260—295 K** **8 Claims**

1. A member selected from the group consisting of a compound of the formula:



wherein each of $R^1$ and $R^2$ is a hydrogen atom or an alkyl group having 1 to 4 carbon atoms; each of $X^1$ and $X^2$ is a hydrogen atom, a halogen atom, an alkyl group having 1 to 4 carbon atoms or an alkoxy group having 1 to 4 carbon atoms; and Y is COOH, COOR (wherein R is an alkyl group having 1 to 4 carbon atoms), $CONH_2$, $CSNH_2$, CN or CO-Z—A—$N(R^3)(R^4)$ (wherein Z is an oxygen atom or the group =NH, A is an alkylene group having 2 to 4 carbon atoms and each of $R^3$ and $R^4$ is a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, or $R^3$ and $R^4$ together with the adjacent nitrogen atom form a saturated heterocycle selected from pyrrolidine, piperidine, morpholine, piperazine and piperazine substituted by an alkyl group having 1 to 4 carbon atoms at the 4-position.

5. A compound of claim 1:

2-[4-(imidazo[1,2-a]pyridin-2-yl)phenyl]propionic acid.

3,978,072

## PHENYLENE BIS-N,N'(PYRIDONES)

Raphael Ralph G. Haber, Givatayim, and Chaim Simonovitch, Rishon Letzion, both of Israel, assignors to Abic Ltd., Israel

Division of Ser. No. 241,847, April 6, 1972, Pat. No. 3,821,235. This application May 31, 1974, Ser. No. 475,194
Claims priority, application Israel, Apr. 14, 1971, 36627
Int. Cl.² C07D *213/14*
U.S. Cl. 260—295.5 R 3 Claims

1. A pyridone derivative selected from the group consisting of 1,4-bis-N,N'-(2'',6''-dimethyl-3',5'-dicarboethoxy-4'-pyridone-N)-2,5-dimethylphenylene and 1,4-bis-N,N'-(2'',6''-dimethyl-3',5'-dicarboethoxy-4'-pyridone-N)-2-methoxyphenylene.

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3,978,073

## 3-(CHLOROCETAMIDO)-5-METHYL ISOXAZOLE

Arthur C. Fabian, Flanders; Jerome D. Genzer, Livingston; Charles Francis Kasulanis, Hopatcong; John Shavel, Jr., Mendham, and Harold Zinnes, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 577,568, May 21, 1975. This application Dec. 29, 1975, Ser. No. 645,057
Int. Cl.² C07D *261/14*
U.S. Cl. 260—307 H 1 Claim

1. 3-(Chloroacetamido)-5-methylisoxazole.

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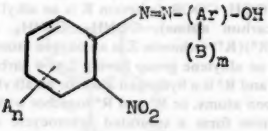
3,978,074

## METHOD OF MAKING HYDROXYARYLBENZOTRIAZOLES AND THEIR N-OXIDES

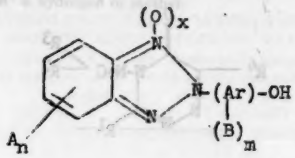
Elmar Harry Jancis, Naugatuck, Conn., assignor to Uniroyal Inc., New York, N.Y.

Filed Nov. 21, 1973, Ser. No. 418,135
Int. Cl.² C07D *249/20*, *401/04*; C08K *5/34*
U.S. Cl. 260—308 B 10 Claims

1. A method of making a benzotriazole compound or N-oxide thereof comprising catalytically hydrogenating an o-nitrophenylazohydroxy starting compound in an alkaline medium by contacting the said o-nitrophenylazohydroxy starting compound with hydrogen in a liquid alkaline medium in the presence of a catalytic amount of a hydrogenation catalyst effective to catalyze said hydrogenation, the said medium being an aqueous medium or a polar organic solvent or mixture thereof containing an alkali metal hydroxide, the said hydrogenation catalyst being a metal which is a platinum metal, nickel, cobalt or molybdenum or an oxide or sulfide of such metal, the hydrogenation being carried out at a temperature within the range of from 15° to 100°C. under a pressure of from one atmosphere to 1000 psig, the said o-nitrophenylazohydroxy starting compound having structural formula




and the resulting benzotriazole compound or N-oxide thereof having the structural formula




wherein Ar is a phenyl or naphthyl moiety, A and B are hydrogen, chlorine, bromine or alkyl, *n* and *m* are from 1 to 4, and *x* is zero or 1, with the further proviso that when the A's or B's are chlorine or bromine in the starting compound their number may be reduced in the product by a number corresponding to the number of any chlorine or bromine atoms eliminated in the process.

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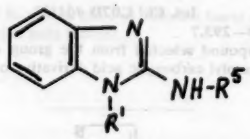
3,978,075

## SUBSTITUTED CARBAMOYL BENZIMIDAZOLE DERIVATIVES WITH ANTIFUNGAL PROPERTIES

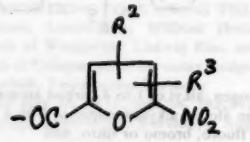
Géza Tóth, and István Tóth, both of Budapest, Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

Filed Apr. 25, 1975, Ser. No. 571,763
Claims priority, application Hungary, May 2, 1974, CI 1473
Int. Cl.² C07D *405/12*
U.S. Cl. 260—309.2 8 Claims

1. A compound of the formula




and antifungal salts thereof wherein $R^1$ is —CO—NH—$R^4$ and $R^5$ is a group with the formula



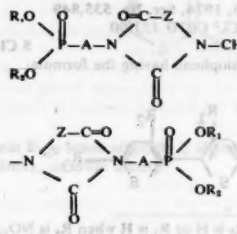

in which $R^2$ and $R^3$ are each hydrogen or $C_1$–$C_6$ alkyl, $R^4$ being $C_1$–$C_6$ alkyl, phenyl, naphthyl, $C_7$ to $C_{10}$ aryl substituted with halogen, $C_1$–$C_6$ alkyl or $C_1$ to $C_6$ alkoxy, or $C_5$–$C_6$ cycloalkyl.

## 3,978,076
## DIALKOXYPHOSPHONOALKYL DERIVATIVES OF CYCLIC UREIDES

Daniel Porret, Binningen, and Jürgen Habermeier, Pfeffingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 419,313, Nov. 27, 1973, Pat. No. 3,892,765. This application May 5, 1975, Ser. No. 574,798
Claims priority, application Switzerland, Dec. 12, 1972, 18030/72
The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.
Int. Cl.² C07D *49/32*
U.S. Cl. 260—309.5 6 Claims

1. A dialkoxyphosphonoalkyl derivative of the formula



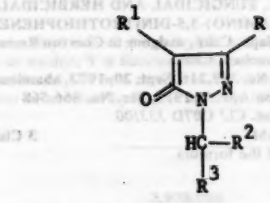
wherein Z is methylene, methylene substituted by alkyl of 1–6 carbon atoms, cyclopentylidene, or cyclohexylidene, $R_1$ and $R_2$ is alkyl or alkenyl of 1 to 4 carbon atoms, alkyl or alkenyl of 1 to 4 carbon atoms substituted by chloro, or $R_1$ and $R_2$ together form an alkylene of 2–5 carbon atoms, and A is alkylene of 1–12 carbon atoms, or diethylene ether.

## 3,978,077
## PYRAZOL-5-ONES

Eike Moller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Great Britain

Division of Ser. No. 461,282, April 15, 1974. This application May 22, 1975, Ser. No. 579,825
Claims priority, application Germany, Apr. 17, 1973, 2319280; Dec. 19, 1973, 2363139
Int. Cl.² C07D *231/22*
U.S. Cl. 260—310 A 39 Claims

1. A compound of the formula



or a pharmaceutically acceptable, nontoxic salt thereof, wherein

R is hydrogen, lower alkyl, lower alkenyl, phenyl or trifluoromethyl; and

$R^1$ is hydrogen, lower alkyl or lower alkenyl;

$R^2$ is lower alkyl; and

$R^3$ is aryl of 6 to 10 carbon atoms substituted by:

a. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkenyl and lower alkoxy;

b. cycloalkyl of 5, 6 or 7 carbon atoms or cycloalkenyl of 5, 6 or 7 carbon atoms;

c. nitro;

d. trifluoromethyl, or nitro, and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen and trifluoromethyl; or

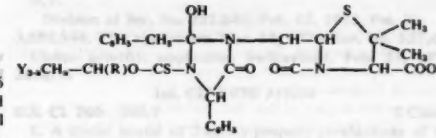
e. a fused, saturated or unsaturated 5-, 6- or 7-membered ring.

## 3,978,078
## PROCESS FOR THE PREPARATION OF AMPICILLIN

Jean Bouchaudon, Morsang-sur-Orge; Pierre Le Roy, Thiais, and Mayer Naoum Messer, Bievres, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Division of Ser. No. 442,430, Feb. 14, 1974, Pat. No. 3,926,956. This application Mar. 10, 1975, Ser. No. 557,095
Claims priority, application France, Feb. 16, 1973, 73.05667
Int. Cl.² C07D *499/80*
U.S. Cl. 260—306.7 C 6 Claims

1. A penicillin G derivative of the formula:



wherein $R_1$ is a group selected from the class consisting of benzyl, p-nitrobenzyl, 2,2,2-trichloroethyl, trityl, dimethylsilyl, trimethylsilyl, phenacyl, p-bromophenacyl, acetyl, propionyl, butyryl, benzoyl, succinyl, methanesulphonyl, p-toluenesulphonyl, methylphosphinyl, methoxyphosphinyl, dimethylphosphinyl, dimethoxyphosphinyl, chloroethoxyphosphinyl, dichloroethoxyphosphinyl, phenylphosphinyl, phenoxyphosphinyl, diphenylphosphinyl, diphenoxyphosphinyl, 4-methyl-1,3,2-dioxaphosphoranyl, 1,3,2-dioxaphosphiranyl and 1,3,2-benzodioxaphospholyl, Y is halogen, *n* is zero, 1 or 2, and R is hydrogen or phenyl.

## 3,978,079
## CHEMILUMINESCENCE

Laszlo Joseph Bollyky, and Robert Henry Weitman, both of Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 223,793, Feb. 4, 1972, abandoned, which is a division of Ser. No. 886,395, Dec. 12, 1969, abandoned, which is a continuation-in-part of Ser. No. 547,761, May 5, 1966, abandoned. This application July 24, 1974, Ser. No. 491,450
Int. Cl.² C07D *209/48*, *207/40*
U.S. Cl. 260—326 N 3 Claims

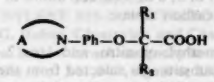
1. Diphthalimido oxalate.
3. Dimaleimido oxalate.

## 3,978,080
## 2-PHENOXY-ALKANOIC ACIDS

Richard William James Carney, New Providence, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 336,668, Feb. 28, 1973, Pat. No. 3,895,032. This application June 20, 1974, Ser. No. 481,261
Int. Cl.² C07D *209/04*
U.S. Cl. 260—326.1 7 Claims

1. A compound of the formula



in which each of $R_1$ and $R_2$ is hydrogen or lower alkyl, Ph is unsubstituted phenylene or phenylene substituted by one or two members of the group consisting of lower alkyl, lower alkoxy, halogeno, trifluoromethyl or nitro and

is indolino or isoindolino which is substituted at the carbon atom adjacent to the imino nitrogen by one oxo group and it is unsubstituted in the aromatic ring, or substituted as shown for Ph, or a lower alkyl ester, (lower alkoxy, di-lower alkylamino or lower alkyleneimino)-lower alkyl ester or a therapeutically useful ammonium, alkali metal, alkaline earth metal, aluminum or acid addition salt thereof.

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**3,978,081**

## 11H,12H-[1]BENZOPYRANO[2,3-b][1]BENZOPYRAN-11,12-DIONE AND DERIVATIVES

**Fritz Elden, and Hans-Dieter Schweiger, both of Munich, Germany, assignors to Chem. pharmaz. Fabrik Dr. Hermann Thiemann GmbH, Lunen, Germany**

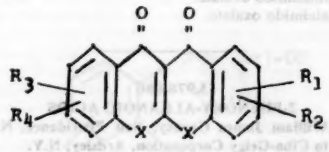
**Filed Mar. 12, 1975, Ser. No. 557,832**

**Claims priority, application Germany, Mar. 15, 1974, 2412582**

**Int. Cl.² C07D 335/06**

**U.S. Cl. 424—275** **10 Claims**

1. An 11H,12H-[1]benzopyrano[2,3-b][1]benzopyran-11,12-dione or an 11H,12H[1]benzothiopyrano[2,3-b][1]benzothiopyran-11,12 dione compound of the formula:



in which $R_1$, $R_2$, $R_3$ and $R_4$ are individually selected from the group consisting of hydrogen, trifluoromethyl, $C_1$–$C_{12}$ alkyl, $C_1$–$C_{12}$ alkoxy, halogen, or hydroxy; or $R_1$ and $R_2$; or $R_3$ and $R_4$ respectively comprise methylenedioxy; X is sulfur or oxygen; and an acid addition salt thereof.

**3,978,082**

## DERIVATIVES OF DINITRO-2,2'-BITHIOPHENE AND APPLICATION THEREOF

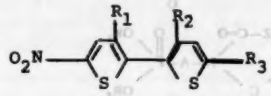
**Petr Ivanovich Buchin, ulitsa Krasnoarmeiskaya, 23, kv. 80; Adolf Evgenievich Lipkin, ulitsa Nevskaya, 5, kv. 51, both of Kuibyshev; Ernest Alexandrovich Rudzit, Noginsky raion, poselok Staraya Kupavna, mikroraion dom 5, kv. 24, Moskovskaya oblast; Boris Alexeevich Zenin, prospekt Lenina, 16, kv. 134, Kuibyshev; Maxim Georgievich Viderker, ulitsa Fadeeva, 67, kv. 45, Kuibyshev; Viktor Alexandrovich Smirnov, Partizanskaya ulitsa, 148, kv. 42, Kuibyshev; Irina Petrovna Balmasova, prospekt Kirova, 258, kv. 45, Kuibyshev; Evgeny Vladimirovich Orlov, ulitsa Vilonovskaya, 2a, kv. 8, Kuibyshev, and Larisa Alexandrovna Chichkova, ulitsa Novo-Sadovaya, 42, kv. 616, Kuibyshev, all of U.S.S.R.**

**Filed Dec. 23, 1974, Ser. No. 535,849**

**Int. Cl.² C07D 333/00**

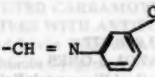
**U.S. Cl. 260—329 HS** **5 Claims**

1. A dinitro - 2,2'-bithiophene having the formula:



where $R_1$ is $NO_2$ when $R_2$ is H or $R_1$ is H when $R_2$ is $NO_2$; and $R_3$ is

$-COCH_3$ or



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**3,978,083**

## BACTERICIDAL, FUNGICIDAL AND HERBICIDAL 2-(N,N-DIALKYLAMINO)-3,5-DINITROTHIOPHENES

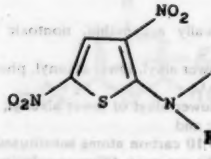
**Leroy H. Edwards, Napa, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation of Ser. No. 399,216, Sept. 20, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,568**

**Int. Cl.² C07D 333/00**

**U.S. Cl. 260—329 AM** **3 Claims**

1. A compound of the formula



wherein $R^1$ and $R^2$ individually are methyl or ethyl.

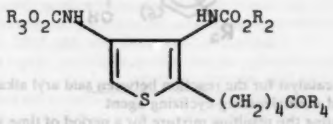
3,978,084

## SYNTHESIS OF BIOTIN

Pasquale Nicholas Confalone, Bloomfield; Milan Radoje Uskokovic, Upper Montclair, and Giacomo Pizzolato, Belleville, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 3, 1973, Ser. No. 421,460
Int. Cl.² C07D 333/24
U.S. Cl. 260—332.2 C 11 Claims

1. A compound of the formula:



wherein $R_3$ is lower alkyl; $R_5$ is aliphatic hydrocarbyl, and $R_4$ is hydroxy, or lower alkoxy.

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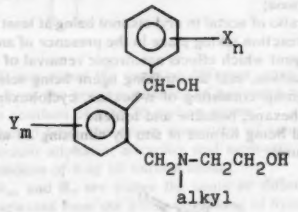
3,978,085

## PROCESS FOR BENZ[f]2,5-OXAZOCINES

John W. Eberlin, Stillwater, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Filed Mar. 7, 1975, Ser. No. 556,315
Int. Cl.² C07D 267/22
U.S. Cl. 260—333 9 Claims

1. In a process for producing 1-phenyl-1,3,4,6-tetrahydrobenzoxazocines the step which comprises treating a compound of the formula



wherein alkyl is methyl or ethyl, X is fluorine, chlorine, bromine or methyl, Y is fluorine, chlorine, methyl or methoxy, *n* is zero, 1 or 2 and *m* is zero, 1 or 2 with at least an equimolar amount of aqueous hydrogen bromide in an inert solvent.

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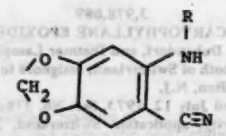
3,978,086

## 2-AMINO-4,5-METHYLENEDIOXYPHENYL NITRILES

George A. Cooke, Denville, and William J. Houlihan, Mountain Lakes, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 351,092, April 13, 1973, Pat. No. 3,876,665, which is a division of Ser. No. 140,990, May 6, 1971, Pat. No. 3,748,342. This application Jan. 27, 1975, Ser. No. 543,983
Int. Cl.² C07D 317/44
U.S. Cl. 260—340.5 1 Claim

1. A compound of the formula:



wherein R is alkyl of 1 to 5 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, or cycloalkylalkyl of 4 to 7 total carbon atoms in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl is straight chain alkyl of 1 to 3 carbon atoms.

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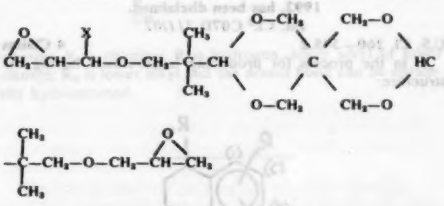
3,978,087

## CYCLIC ACETALS CONTAINING EPOXIDE GROUPS

Alfred Renner, Munchenstein, and Rolf Hügi, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 332,840, Feb. 15, 1973, Pat. No. 3,884,944. This application Mar. 11, 1975, Ser. No. 557,449
Claims priority, application Switzerland, Feb. 24, 1972, 2638/73
Int. Cl.² C07D 319/04
U.S. Cl. 260—340.7 2 Claims

1. A cyclic acetal of 2-epoxy-propoxy-pivaldehyde of the formula



wherein X is hydrogen or methyl.

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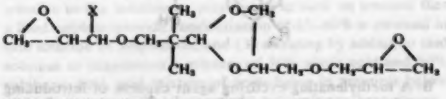
3,978,088

## CYCLIC ACETALS CONTAINING EPOXIDE GROUPS

Alfred Renner, Munchenstein, and Rolf Hugi, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 332,840, Feb. 15, 1973, Pat. No. 3,884,944. This application Mar. 11, 1975, Ser. No. 557,450
Claims priority, application Switzerland, Feb. 24, 1972, 2638/72
Int. Cl.² C07D 317/08
U.S. Cl. 260—340.9 2 Claims

1. A cyclic acetal of 2-epoxy-propoxy-pivaldehyde of the formula



wherein X is hydrogen or methyl.

**3,978,089**

## CARYOPHYLLANE EPOXIDE

**Roman Kaiser, Dubendorf, and Dietmar Lamparsky, Wangen-Dubendorf, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.**

**Filed July 12, 1973, Ser. No. 378,478**

**Claims priority, application Switzerland, July 19, 1972, 10843/72; July 19, 1972, 10844/72**

**Int. Cl.² C07D *311/00***

**U.S. Cl. 260—345.1** **1 Claim**

**1.** Substantially pure 3,7-caryophyllane epoxide.

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**3,978,090**

## PROCESS FOR PRODUCTION OF ISOCHROMANS

**James Milton Sanders, Eatontown, and Loren Hall Michael, East Windsor, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.**

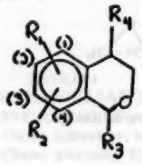
**Continuation-in-part of Ser. No. 466,068, May 1, 1974, Pat. No. 3,910,964. This application June 26, 1975, Ser. No. 590,471**

**The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.**

**Int. Cl.² C07D *311/02***

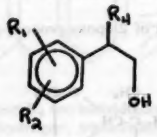
**U.S. Cl. 260—345.2** **4 Claims**

**1.** In the process for producing isochromans having the structure:



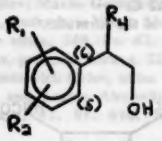
wherein $R_1$ and $R_2$ are each (i) separately, selected from the group consisting of hydrogen, lower alkoxyl, and lower alkyl, and (ii) taken together, when $R_1$ and $R_2$ are located at the "2" and "3" positions of the benzene ring, selected from the group consisting of benzo, cyclopentano, cyclohexano, naphtho, mono-lower alkyl cyclopentano, poly-lower alkyl cyclopentano, mono-lower alkyl cyclohexano and poly-lower alkyl cyclohexano, and $R_3$ and $R_4$ are the same or different and are selected from the group consisting of hydrogen and lower alkyl, comprising the steps of intimately admixing:

A. An aryl alkanol having the structure:



B. A methylenating-cyclizing agent capable of introducing the moiety:

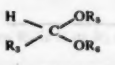
between the oxygen atom and the number "5" carbon atom of the structure:



C. A catalyst for the reaction between said aryl alkanol and said methylenating-cyclizing agent

and heating the resulting mixture for a period of time whereby a substantial amount of (i) the isochroman having the above structure is formed and (ii) water of reaction is formed; the improvement consisting of:

1. The methylenating-cyclizing agent being an acetal having the structure:



wherein $R_5$ and $R_6$ are each 2-propyl;

2. The catalyst being a protonic acid selected from the group consisting of p-toluene sulfonic acid and phosphoric acid;

3. The reaction mass not containing at any time during or subsequent to the reaction any hydrogen chloride or corrosive halide salts or chloromethyl methyl ethers;

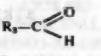
4. The reaction temperature being in the range of from 80° up to 95°C;

5. The acid concentration being fromm 1 up to 100% by weight based on the weight of the remainder of the reaction mass;

6. The ratio of acetal to aryl alkanol being at least 0.1:1; and

7. The reaction taking place in the presence of an azeotroping agent which effects azeotropic removal of said water of reaction, said azeotroping agent being selected from the group consisting of n-hexane, cyclohexane, methyl cyclohexane, benzene and toluene

said acetal being formed in situ by admixing an aldehyde of the structure:



with 2-propanol wherein $R_3$ is hydrogen or lower alkyl.

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**3,978,091**

## 2,4-DIMETHYL-3-CARBOXYANILIDOFURAN COMPOUNDS

**Shigeru Tsuchiya, Shimizu; Yoshitaka Suda, Shizuoka; Isao Chiyomaru, Shimizu; Seigo Kawada, Fujieda, and Kiyoshi Takita, Kitawaki-Shimizu, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan**

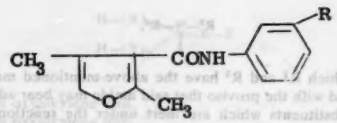
**Filed Feb. 27, 1974, Ser. No. 446,430**

**Claims priority, application Japan, Mar. 1, 1973, 48-24645; Mar. 2, 1973, 48-24870; Aug. 25, 1973, 48-95556**

**Int. Cl.² C07D *307/66***

**U.S. Cl. 260—347.3** **8 Claims**

**1.** A 2,4-dimethyl-3-carboxyanilido-furan compound of the formula



wherein R is $C_{1-10}$ alkyl, $C_{1-10}$ alkoxy, $C_{3-10}$ alkenyloxy or $C_{3-10}$ alkynyloxy.

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3,978,092

## PROCESS FOR THE PREPARATION OF UNSATURATED CARBONYL COMPOUNDS

Yataro Ichikawa, and Mamoru Yamamoto, both of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

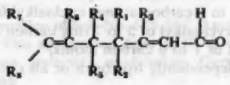
Filed May 6, 1974, Ser. No. 467,618

Claims priority, application Japan, May 14, 1973, 48-52630; May 15, 1973, 48-53186; Oct. 4, 1973, 48-110947

Int. Cl.² C07D *307/46*; C07C *47/20*, *47/45*

U.S. Cl. 260—347.8 13 Claims

1. A process for the preparation of an unsaturated carbonyl compound of the formula (II)



(II)

in which:

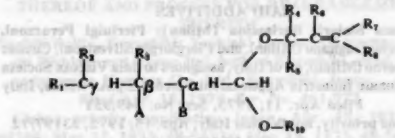
$R_1$ and $R_2$ are either the same or different, each being selected from the group consisting of hydrogen and hydrocarbon residues of 1 to 20 carbon atoms;

$R_3$ is selected from the group consisting of saturated and unsaturated aliphatic, alicyclic, and aromatic hydrocarbon residues of 1 to 10 carbon atoms;

$R_4$, $R_5$, $R_6$, and $R_7$ are either the same or different, each being selected from the group consisting of hydrogen and hydrocarbon residues of 1 to 10 carbon atoms;

$R_8$ is selected from the group consisting of hydrogen and hydrocarbon residues of 1 to 45 carbon atoms; and optionally, $R_4$ joining with $R_6$ and $R_7$, or $R_7$ joining with $R_8$ or $R_8$ to form an alicyclic ring or an oxygen-containing heterocyclic ring,

which comprises heating an allylacetal of formula (I) in an inert organic solvent

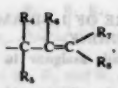


(I)

in which

$R_1$, $R_2$, $R_3$, $R_4$, $R_5$, $R_6$, $R_7$, and $R_8$ have the same definitions as in formula (II);

$R_{10}$ is a member selected from the group consisting of



hydrogen, hydrocarbon residues of 1 to 20 carbons and carboxylic acid residues of 1 to 20 carbons;

A represents an alkoxy group or a carboxylic acid residue having 1 to 20 carbons; B represents hydrogen, at a temperature of 100° to 400°C. and separating the formed unsaturated carbonyl compound of formula (II) from the reaction mixture.

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3,978,093

## SYNTHESIS OF HYDROXYCYCLOPENTEN-1-ONES

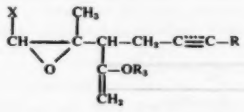
George Buchi, Cambridge, Mass., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 158,080, June 29, 1971, Pat. No. 3,884,979. This application Feb. 6, 1975, Ser. No. 547,688

Int. Cl.² C07D *303/22*

U.S. Cl. 260—348 R 2 Claims

1. A compound of the formula:



wherein X is chlorine; R is hydrogen, lower alkyl or lower alkenyl; $R_3$ is lower alkyl and the dotted bond can be optionally hydrogenated.

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3,978,094

## PROCESS FOR THE MANUFACTURE OF 1,4-DIAMINO-5-NITROANTHRAQUINONE

Maurice Grélat, Bettingen, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 491,438, July 24, 1974, abandoned. This application Nov. 5, 1975, Ser. No. 629,157

Claims priority, application Switzerland, July 31, 1973, 11144/73

Int. Cl.² C07C *97/12*, *97/24*

U.S. Cl. 260—378 3 Claims

1. In a process for the manufacture of 1,4-diamino-5-nitroanthraquinone from 1,4-diaminoanthraquinone by nitration with a mixture of 50% nitric acid and 50% sulphuric acid, before which nitration a masking of the two amino groups to form 1,9-4,10-anthraquinone-disulphonamide takes place, this intermediate being in turn split by hydrolysis after the nitration, the improvement comprising the steps of (1) dissolving or suspending 1,4-diaminoanthraquinone in concentrated sulphuric acid or in concentrated sulphuric acid containing dissolved sulphur trioxide or in concentrated phosphoric acid, (2) carrying out the masking by adding liquid sulphur trioxide to the solution or suspension in such an amount that a final sulphur trioxide concentration of 35–60% is attained in said solution or suspension, and (3) nitrating by adding to said solution or suspension a mixture of 50% nitric acid and 50% sulphuric acid, said mixture of acids being in amounts below 100 kilogram per 100 kilogram of 1,4-diaminoanthraquinone.

3,978,095

## PROCESS FOR THE MANUFACTURE OF 1,4-DIAMINO-5-NITROANTHRAQUINONE

Maurice Greiat, Bettingen, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 491,439, July 24, 1974, abandoned. This application Nov. 5, 1975, Ser. No. 629,158

Claims priority, application Switzerland, July 31, 1973, 11145/73

Int. Cl.² C07C 97/12, 97/24

U.S. Cl. 260—378 3 Claims

1. In a process for the manufacture of 1,4-diamino-5-nitroanthraquinone from 1,4-diaminoanthraquinone by nitration with a mixture of 50% nitric acid and 50% sulphuric acid, before which nitration a masking of the two amino groups to form 1,9-4,10-anthraquinone-disulphonimide takes place, this intemediate being in turn split by hydrolysis after the nitration, the improvement comprising the steps of (1) carrying out the masking of the 1,4-diaminoanthraquinone with liquid sulphur trioxide in a medium of inert liquid solvents to form 1,9-4,10-anthraquinone-disulphonimide in the medium, said sulphur trioxide being in an amount of 4 to 8 mols to 1 of 1,4-diaminoanthraquinone and (2) carrying out the nitration of the formed 1,9-4,10-anthraquinone-disulphonimide in said medium with a mixture of 50% nitric acid and 50% sulphuric acid, said mixture of acids being in amounts below 100 kilogram per 100 kilogram of 1,4-diaminoanthraquinone.

3,978,096

## PRODUCTION OF 1-CHLOROANTHRAQUINONE

Heinz Eilingsfeld, Frankenthal, and Manfred Patsch, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 5, 1974, Ser. No. 476,398

Claims priority, application Germany, July 7, 1973, 2329036

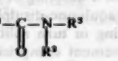
Int. Cl.² C07C 49/68; C09B 1/00, 1/10

U.S. Cl. 260—384 11 Claims

1. A process for the production of 1-chloroanthraquinone which comprises decarboxylating 4-chloroanthraquinone-1-carboxylic acid at an elevated temperature in the presence of

a. a heavy metal catalyst containing a heavy metal of Group Ib, IVb or VIIIb of the Periodic Table, and

b. about 2 to 160 moles for each mole of starting material of an amide of the formula



in which:

each of $R^1$, $R^2$ and $R^3$ is alkyl of one to four carbon atoms, cyclohexyl, aralkyl of seven to twelve carbon atoms or phenyl; $R^1$ and $R^2$ when taken together with the adjacent carbon atoms and nitrogen atom complete a five-membered or six-membered heterocyclic ring; $R^2$ and $R^3$ when taken together with the adjacent nitrogen atom complete a five-membered or six-membered heterocyclic ring; or $R^1$ may also be hydrogen or the radical

in which $R^2$ and $R^3$ have the above-mentioned meanings; and with the proviso that said amide may bear additional substituents which are inert under the reaction conditions.

3,978,097

## ETHER AND THIOETHER SUBSTITUTED 3,4-ALKYLENEDIOXYBENZENES

Fritz Schaub, Basel, and Hans-Peter Schelling, Oberwil, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

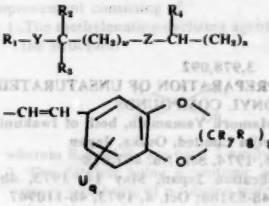
Filed Aug. 6, 1973, Ser. No. 385,738

Claims priority, application Switzerland, Aug. 10, 1972, 11840/72; June 8, 1973, 8349/73

Int. Cl.² C07D 317/06, 317/44, 323/02

U.S. Cl. 260—340.5 16 Claims

1. A compound of the formula:



wherein

$R_1$ is alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms or cycloalkyl of 5 to 7 ring carbon atoms substituted by alkyl of 1 to 6 carbon atoms,

$R_2$, $R_3$ and $R_4$ are independently hydrogen or alkyl of 1 to 4 carbon atoms,

Z is $—CR_5=CH—$ , $—CH=CR_5—$ or $—CHR_5$ ,

$R_5$ is hydrogen or alkyl of 1 to 4 carbon atoms,

Y is oxygen or sulfur,

$w$ and $n$ are independently 0 to 4,

U is alkyl of 1 or 2 carbon atoms, alkoxy of 1 or 2 carbon atoms or alkylthio of 1 or 2 carbon atoms,

$R_7$ and $R_8$ are independently hydrogen or alkyl of 1 or 2 carbon atoms,

$p$ is 1, and

$q$ is 0 to 2.

3,978,098

## METHOD AND ADDITIVES FOR IMPARTING ANTISTATIC PROPERTIES TO POLYAMIDE COMPOSITIONS AND POLYAMIDES OBTAINED ACCORDING TO SAID METHOD AND WITH THE USE OF SAID ADDITIVES

Francesco Siclari, Barlassina (Milan); Pierluigi Perazzoni, Paderno Dugnano (Milan), and Piergiorgio Silvestroni, Cesano Maderno (Milan), all of Italy, assignors to Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy

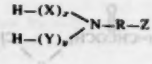
Filed Apr. 11, 1973, Ser. No. 349,951

Claims priority, application Italy, Apr. 15, 1972, 23197/72

Int. Cl.² C07C 101/04

U.S. Cl. 260—404 15 Claims

1. A compound for imparting antistatic properties to polyamide compositions comprising a monovalent group having the following formula:



wherein:

X is an oxyalkylene unit,

Y is an oxyalkylene unit,

R is a hydrocarbyl alipatic, hydrocarbyl cycloaliphatic or phenyl radical,

Z is a carbonyl radical,

N is nitrogen and H is hydrogen,

*x* is comprised between 1 and 1500 and is the number of the recurring units in the polyoxyalkylene chain,

*y* is zero or a number between 1 and 1500, and wherein the free valency of the monovalent group is saturated by a monovalent radical —OH, —OMe$^{I}$ (wherein Me$^{I}$ is an alkali metal), —OR (wherein R is an alkyl radical), or —O(K)$_k$—H where K is an oxyethylene unit and k is a number between 1 and 1500, or being saturated by a valency of a bivalent radical —OMe$^{II}$O—, (wherein Me$^{II}$ is an alkaline earth metal), in such case two groups of said formula being correspondingly bound to said bivalent radical,

wherein $(x + y + k)$ is not less than 20 and $(X)_x + (Y)_y + (K)_k$ is at least 70% by weight of the compound.

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**3,978,099**

## SOLID ACETYLTARTARIC ACID ESTERS OF HIGH FLUIDITY IN POWDER FORM, AND PROCESS FOR THE PREPARATION THEREOF

**Rudolf Tuma, and Rotraud Lebender, both of Witten, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany**

**Continuation of Ser. No. 139,267, April 30, 1971, abandoned. This application Apr. 2, 1974, Ser. No. 457,278**

**Claims priority, application Germany, May 2, 1970, 2021565**

**Int. Cl.$^2$ C09F *5/00*; A23D *3/00***

**U.S. Cl. 260—404.8** **10 Claims**

1. Solid pulverized acetyltartaric acid esters having fluidity in said pulverized form, said esters comprising reaction products of partial glycerides of mixtures of saturated $C_{14}$ to $C_{22}$ fatty acids having a monoglyceride content of 57 to 63% by weight, and iodine values of below 5; and containing 0.91 to 1.8 moles of tartaric acid and 1.8 to 3.4 moles of acetic acid bound to tartaric acid, per mole of partial glyceride.

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**3,978,100**

## ALLENIC ESTERS, PROCESS FOR PREPARATION THEREOF AND PROCESS FOR REARRANGEMENT THEREOF

**Yoshiji Fujita, Kurashiki; Yoshiaki Omura, Okayama; Takashi Hishida, and Kazuo Itoi, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan**

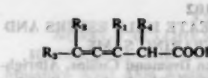
**Filed Apr. 18, 1974, Ser. No. 461,977**

**Claims priority, application Japan, Apr. 18, 1973, 48-44308; May 15, 1973, 48-54334; May 15, 1973, 48-54335**

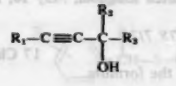
**Int. Cl.$^2$ C11C *3/02***

**U.S. Cl. 260—410.9 R** **7 Claims**

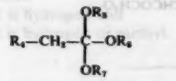
1. A process for the preparation of allenic esters represented by the formula:



wherein $R_1$, $R_2$ and $R_4$ each represents hydrogen or a radical having from 1–20 carbon atoms; $R_3$ represents a radical having at least 2 carbon atoms; $R_2$ and $R_3$ may together form a cyclic ring; and R represents a radical having from 1–8 carbon atoms, said process comprising reacting a propargyl alcohol derivative represented by the following formula:



wherein $R_1$, $R_2$ and $R_3$ are as defined above with a 2-substituted ortho-acetic acid ester represented by the following formula:



wherein $R_4$ is as defined above and $R_5$, $R_6$ and $R_7$, which may be the same or different, have the same meaning as R defined above, in the presence of an acidic catalyst.

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**3,978,101**

## RHODIUM COMPLEXES OF ASYMMETRIC DIPHOSPHINES, THEIR PREPARATION AND THEIR USE

**Paul Aviron-Violet, Saint Genis Laval, France, assignor to Rhone-Poulenc S.A., Paris, France**

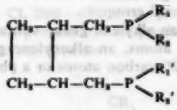
**Division of Ser. No. 470,866, May 17, 1974, Pat. No. 3,949,000. This application June 25, 1975, Ser. No. 590,319**

**Claims priority, application France, May 21, 1973, 73.18319**

**Int. Cl.$^2$ C07F *15/00***

**U.S. Cl. 260—429 R** **3 Claims**

1. A rhodium complex in which the rhodium is bound to halogen and a diphosphine of the formula:



in which the phosphinomethyl groups are in the trans-position relative to one another, and the groups $R_1$, $R_2$, $R'_1$ and $R'_2$, which may be identical or different, each represent straight or branched alkyl of 1 to 8 carbon atoms, cycloalkyl of 5 or 6 ring carbon atoms, or aryl consisting of one or more benzene rings which are bonded to one another by a valency bond or which form with one another an ortho- or peri-condensed system, the said aryl being unsubstituted or substituted by straight or branched alkyl of 1 to 4 carbon atoms, the said complex containing between 0.5 to 2 mols of said diphosphine per atom of rhodium.

## 3,978,102

## NOVEL DIORGANOTIN MALEATE HALF ESTERS AND PROCESS FOR PREPARING SAME

Harold Coates, Wombourne; John Desmond Collins, Albrighton, and Iftikhar Hussain Siddiqui, Birmingham, all of England, assignors to Albright & Wilson Limited, Midlands, England

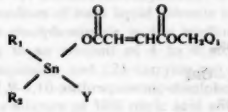
Continuation-in-part of Ser. No. 359,177, May 10, 1973, abandoned, Ser. No. 490,241, July 22, 1974, Pat. No. 3,933,743 is a divisional of Ser. No. 359,177. This application Jan. 13, 1975, Ser. No. 540,428.

Claims Priority, application United Kingdom, May 10, 1972 21828/72

Int. Cl.[2] C07F 7/22

U.S. Cl. 260—429.7 17 Claims

1. An organotin compound of the formula



wherein $R_1$ and $R_2$ are individually selected from the group consisting of alkyl groups containing between 1 and 20 carbon atoms, cycloalkyl and phenyl groups, $Q_1$ represents a group of the formula

wherein $Q_2$ is a hydrogen atom, an alkyl group containing between 1 and 6 carbon atoms or $-CH_2Z_3$,

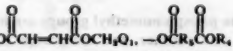
$Z_1$, $Z_2$, and $Z_3$ are individually selected from the group consisting of

$R_3$ is an alkyl group containing between 1 and 20 carbon atoms, a phenyl or alkylphenyl group,

$R_4$ is an alkyl group containing between 1 and 20 carbon atoms, a phenyl or alkylphenyl group,

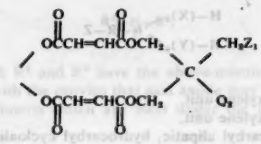
$R_5$ represents a single bond, an alkylene group containing between 1 and 20 carbon atoms, an alkenylene group containing between 2 and 20 carbon atoms or a phenylene group, and

Y is of the formula



or Y and the aforementioned

together constitute a divalent group of the formula



wherein both free valences of said divalent group are bonded to the same tin atom.

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## 3,978,103

## SULFUR CONTAINING ORGANOSILICON COMPOUNDS

Eugen Meyer-Simon; Werner Schwarze, both of Frankfurt; Friedrich Thurn, Grossauheim, and Rudolf Michel, Somborn, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany

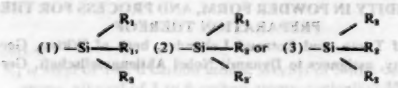
Division of Ser. No. 277,043, Aug. 1, 1972, Pat. No. 3,842,111. This application May 6, 1974, Ser. No. 467,583

Claims priority, application Germany, Aug. 17, 1971, 2141159; Aug. 17, 1971, 2141160; Mar. 14, 1972, 2212239

Int. Cl.[2] C07F 7/18

U.S. Cl. 260—448.8 R 28 Claims

1. A compound having the formula Z — alk — $S_n$ — alk — Z, in which Z is



wherein $R_1$ is alkyl of 1 to 4 carbon atoms or phenyl and $R_2$ is ethoxy or cycloalkoxy with 5 to 8 carbon atoms, alk is a divalent hydrocarbon of 2 to 18 carbon atoms and $n$ is an integer of 3 to 6.

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## 3,978,104

## PROCESS FOR PRODUCING DIORGANOPOLYSILOXANE OILS

John S. Razzano, Watervliet, N.Y., assignor to General Electric Company, Waterford, N.Y.

Continuation-in-part of Ser. No. 463,435, April 24, 1974. This application May 5, 1975, Ser. No. 574,334

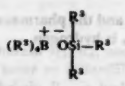
Int. Cl.[2] C07F 7/08

U.S. Cl. 260—448.2 E 13 Claims

1. A process for producing a diorganopolysiloxane oil having a viscosity from 50 to 100,000 centipoise at 25°C. where at least one of the organo groups is an aliphatic or haloaliphatic radical of at least 3 carbon atoms or more comprising (a) reacting cyclic polysiloxanes of the formula,

$(R\ R'\ SiO)_4$

and mixtures thereof, at a temperature in the range of 0° to 90°C. in the presence of 5 to 300 parts per million of a catalyst selected from the class consisting of CsOH, silanolates thereof, and compounds of the formula,



where $R^2$ is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms, cycloalkyl radicals of 4 to 8 carbon atoms and phenyl, B is selected from the class consisting of nitrogen and phosphorous, $R^3$ is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms, cycloalkyl radicals of 4 to 8 carbon atoms, phenyl, siloxane chains of the unit formula, $R_a^4 SiO_{4-a/2}$ and mixtures thereof where $R^4$ is selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, and $a$ is from 1.5 to 2.5, and (b) neutralizing the catalyst in the reaction mixture after equilibration has been reached, where R is selected from the class consisting of methyl, ethyl, vinyl and phenyl, and R' is selected from the class consisting of alkyl radicals, halogenated alkyl radicals and cycloalkyl radicals of 3 to 8 carbon atoms.

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**3,978,105**

## MANUFACTURE OF ORGANIC ISOCYANATES

**Werner Fuchs, Ludwigshafen; Rolf Platz, Mannheim, and Volker Vogt, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Jan. 23, 1975, Ser. No. 543,244**

**Claims priority, application Germany, Feb. 1, 1974, 2404773**

**Int. Cl.² C07C *118/02***

**U.S. Cl. 260—453 PH** **5 Claims**

1. A method of preparing organic isocyanates which comprises (a) mixing together in the absence of an organic solvent a primary amine with at least 3 moles of phosgene per amino group of said primary amine and simultaneously grinding the reaction mixture to an average particle size from about 1 to 100 $\mu$, and (b) heating the resulting suspension of carbamyl chloride and amine hydrochloride in presence of phosgene to a temperature of from about 100°C to about 180°C and at a pressure of from about 14 to 55 bars to form the corresponding isocyanate.

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**3,978,106**

## CERTAIN THIOFORMALDOXIMINO DITHIOPHOSPHORIC ACIDS

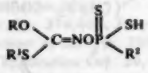
**Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Division of Ser. No. 26,149, April 6, 1970, Pat. No. 3,652,736. This application Nov. 22, 1971, Ser. No. 201,190**

**Int. Cl.² C07C *119/18***

**U.S. Cl. 260—453 R** **1 Claim**

1. The compound having the formula



in which R is (1) alkyl having 1 to 4 carbon atoms; or (2) allyl, $R^1$ is alkyl having 1 to 4 carbon atoms; and $R^2$ is alkyl having 1 to 4 carbon atoms.

**3,978,107**

## NOVEL CYCLOHEXYL CARBAMATES AND HERBICIDAL AND ACARICIDAL COMPOSITIONS

**Masahiro Aya; Akio Kudamatsu; Masao Miyamoto; Nobuo Fukazawa, and Shigeki Osuga, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

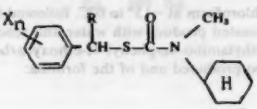
**Filed May 10, 1971, Ser. No. 142,026**

**Claims priority, application Japan, May 9, 1970, 45-39186**

**Int. Cl.² C07C *155/03***

**U.S. Cl. 260—455 A** **3 Claims**

1. Cyclohexyl carbamate compound of the formula:



wherein

X is hydrogen and

R is hydrogen or methyl.

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**3,978,108**

## CIS METHYL DIHYDROJASMONATE

**Paul Jose Teisseire, Grasse, and Marcel Plattier, Antibes, both of France, assignors to Societe Anonyme des Etablissements Roure-Bertrand Fils & Justin Dupont, Paris, France**

**Filed Dec. 17, 1971, Ser. No. 209,239**

**Claims priority, application France, Dec. 23, 1970, 70.46407**

**Int. Cl.² C07C *69/74***

**U.S. Cl. 260—468 K** **2 Claims**

1. Substantially pure cis methyl dihydrojasmonate having in its infrared spectrum single bands at 1010 $cm^{-1}$ and 1250 $cm^{-1}$, a small band at 1095 $cm^{-1}$ and a medium band at 1310 $cm^{-1}$ and, in its NMR spectrum, a multiplet centered at 2.72 p.p.m. corresponding to the proton situated $\alpha$ to the carbonyl group, and being substantially free from trans methyl dihydrojasmonate.

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**3,978,109**

## PROCESS FOR SUBSTITUTED CYCLOHEXENES

**Gerhard Satzinger, Gundelfingen, and Gustav Hechtfischer, Freiburg-Landwasser, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.**

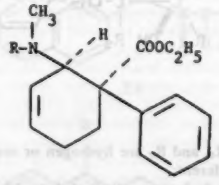
**Division of Ser. No. 117,142, Feb. 19, 1971, Pat. No. 3,792,080. This application Aug. 9, 1973, Ser. No. 387,860**

**Claims priority, application Germany, Feb. 17, 1970, 2007215**

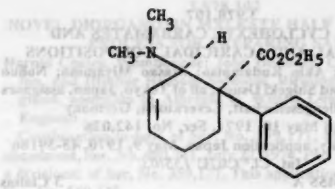
**Int. Cl.² C07C *101/04***

**U.S. Cl. 260—471 A** **1 Claim**

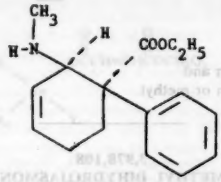
1. A process for the production of N-alkyl and N-aminoalkyl of the formula:



in which R represents a lower alkyl of 1–7 carbons or an amino substituted lower alkyl of 1–7 carbons, said process comprising treatment of 3r-N,N-dimethylamino-4c-phenyl-4t-ethoxycarbonyl-cyclohexene-(1)



with bromine in chloroform at −15° to 0°C. followed by treatment of the brominated product with water and reacting the 3r-N-monomethylamino-4c-phenyl-4t-ethoxycarbonyl-cyclohexene-(1) so produced and of the formula:



with one equivalent of lower alkyl halide or lower alkyl sulfate, lower alkyl being defined as having 1–7 carbons, at 70° – 130°C in a suitable solvent or in the absence of a solvent in the presence of at least one equivalent of N-ethyl-diisopropylamine.

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**3,978,110**

**8β,12α,15β-17-PHENYL-18,19,20-TRINOR-PGF₂ β COMPOUNDS**

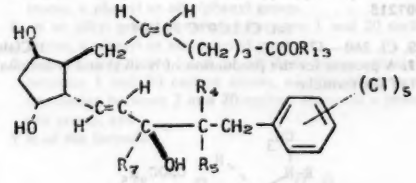
**Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 374,405, June 28, 1973, which is a continuation-in-part of Ser. No. 289,317, Sept. 15, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,683**

**Int. Cl.² C07C 65/22, 65/14**

**U.S. Cl. 260—473 A** **6 Claims**

1. An optically active compound of the formula



wherein $R_4$, $R_5$, and $R_7$ are hydrogen or methyl, being the same or different;

werein $R_{13}$ is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with 1, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and

wherein $s$ is zero, 1, 2, or 3;

including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when $R_{13}$ is hydrogen.

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**3,978,111**

**8β,11β,12α-17-PHENYL-18,19,20-TRINOR-PGE₂ COMPOUNDS**

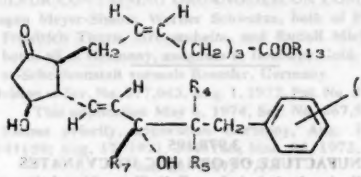
**Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 374,405, June 28, 1973, which is a continuation-in-part of Ser. No. 289,317, Sept. 15, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,432**

**Int. Cl.² C07C 65/22, 65/14**

**U.S. Cl. 260—473 A** **6 Claims**

1. An optically active compound of the formula



wherein $R_4$, $R_5$, and $R_7$ are hydrogen or methyl, being the same or different;

wherein $R_{13}$ is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with 1, 2, or 3 chloro or alkyl of 1 to 4 carbon atoms, inclusive; and

wherein $s$ is zero, 1, 2, or 3;

including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when $R_{13}$ is hydrogen.

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**3,978,112**

**8β,11β,12α-17-PHENYL-PGF₂ β COMPOUNDS**

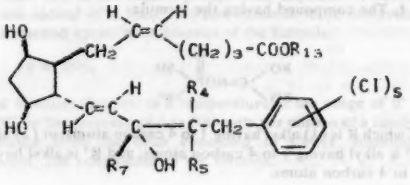
**Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 374,405, June 28, 1973, which is a continuation-in-part of Ser. No. 289,317, Sept. 15, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,431**

**Int. Cl.² C07C 65/22, 65/14**

**U.S. Cl. 260—473 A** **6 Claims**

1. An optically active compound of the formula



wherein $R_4$, $R_5$, and $R_7$ are hydrogen or methyl, being the same or different;
wherein $R_{13}$ is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with 1, 2, or 3 chloro or alkyl of 1 to 4 carbon atoms, inclusive; and
wherein $s$ is zero, 1, 2, or 3;
including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when $R_{13}$ is hydrogen.

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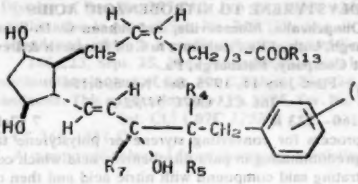
**3,978,113**

**8β,11β,12α-17-PHENYL-18,19,20-TRINOR-PGF$_{2\alpha}$ COMPOUNDS**

**Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 374,405, June 28, 1973, which is a continuation-in-part of Ser. No. 289,317, Sept. 15, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,434**
**Int. Cl.² C07C *65/22, 65/14***
**U.S. Cl. 260—473 A** **6 Claims**

1. An optically active compound of the formula



wherein $R_4$, $R_5$, and $R_7$ are hydrogen or methyl, being the same or different;
wherein $R_{13}$ hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with 1, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and
wherein $s$ is zero, 1, 2, or 3;
including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when $R_{13}$ is hydrogen.

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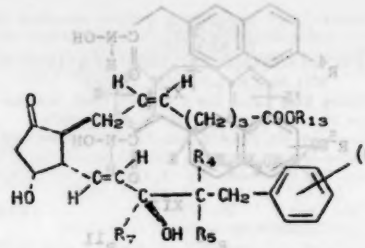
**3,978,114**

**8β,12α,15β-17-PHENYL-18,19,20-TRINOR-PGE$_2$ COMPOUNDS**

**Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 374,405, June 28, 1973, which is a continuation-in-part of Ser. No. 289,317, Sept. 15, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,641**
**Int. Cl.² C07C *65/14, 65/22***
**U.S. Cl. 260—473 A** **6 Claims**

1. An optically active compound of the formula



wherein $R_4$, $R_5$, and $R_7$ are hydrogen or methyl, being the same or different;
wherein $R_{13}$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with 1, 2, or 3 chloro or alkyl of 1 to 4 carbon atoms, inclusive; and
wherein $s$ is zero, 1, 2, or 3;
including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when $R_{13}$ is hydrogen.

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**3,978,115**

**PRECURSORS FOR PROSTAGLANDIN E$_1$**

**Zbigniew S. Zelawski, Piscataway, and Norman L. Wendler, Summit, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Division of Ser. No. 356,528, May 2, 1973. This application May 14, 1975, Ser. No. 577,267**
**Int. Cl.² C07C *69/16, 69/28***
**U.S. Cl. 260—488 R** **2 Claims**

1. 2α-Methyl-3α,4α-diloweralkanoyloxymethyl cyclohexanone.

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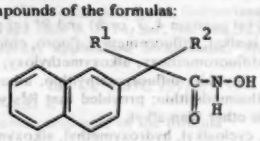
**3,978,116**

**2-NAPHTHYL ACETIC ACID DERIVATIVES AND COMPOSITIONS AND METHODS THEREOF**

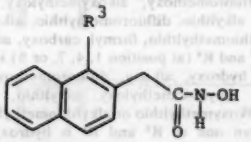
**John H. Fried, and Ian T. Harrison, both of Palo Alto, Calif., assignors to Syntex Corporation, Panama, Panama**

**Division of Ser. No. 195,878, Nov. 4, 1971, Pat. No. 3,896,157, which is a division of Ser. No. 694,771, Dec. 7, 1967, abandoned, which is a continuation-in-part of Ser. No. 608,997, Jan. 13, 1967, abandoned. This application Mar. 17, 1975, Ser. No. 559,357**
**Int. Cl.² C07C *119/00, 83/00***
**U.S. Cl. 260—500.5 H** **13 Claims**

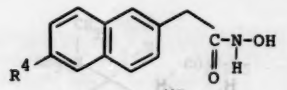
1. The compounds of the formulas:



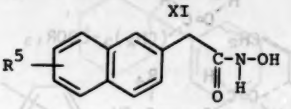
IX



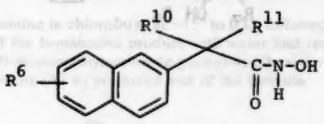
X



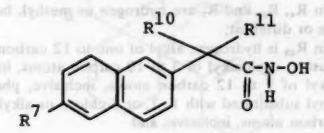
XI



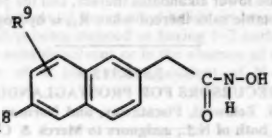
XII



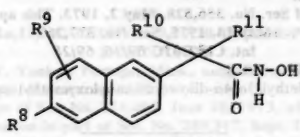
XIII



XIV



XV



XVI

wherein one of $R^1$ and $R^2$ is hydrogen and the other is difluoromethyl, fluoro, or chloro; or

$R^1$ and $R^2$ taken together are alkylidene, halomethylene, or ethylene;

$R^3$ is trifluoromethyl, difluoromethoxy, alkoxymethyloxy, alkylthio, difluoromethylthio, alkoxymethylthio or alkylthiomethylthio;

$R^4$ is cycloalkyl, hydroxymethyl, alkoxymethyl, trifluoromethyl, vinyl, ethynyl, alkoxymethyloxy, alkylthiomethylthio, difluoromethoxy, alkoxymethylthio, alkylthiomethyloxy, difluoromethylthio, formyl, carboxy, acetyl, or aryl;

each of $R^5$ (at position 4, 7, or 8) and $R^6$ (at position 1, 4, 7, or 8) is alkyl, trifluoromethyl, fluoro, chloro, hydroxy, alkoxy, difluoromethoxy, alkoxymethyloxy, alkylthiomethyloxy, alkylthio, difluoromethylthio, alkoxymethylthio or alkylthiomethylthio; provided that $R^5$ (when at position 7) is other than alkyl;

$R^7$ is alkyl, cycloalkyl, hydroxymethyl, alkoxymethyl, trifluoromethyl, vinyl, ethynyl, fluoro, chloro, hydroxy, alkoxy, difluoromethoxy, alkoxymethyloxy, alkylthiomethyloxy, alkylthio, difluoromethylthio, alkoxymethylthio or alkylthiomethylthio, formyl, carboxy, acetyl, or aryl;

each of $R^8$ and $R^9$ (at position 1, 4, 7, or 8) is alkyl, fluoro, chloro, hydroxy, alkoxy, difluoromethoxy, alkoxymethyloxy, alkylthiomethyloxy, alkylthio, difluoromethylthio, alkoxymethylthio or alkylthiomethylthio, the other is the identical group or alkyl, fluoro, or chloro;

one of $R^{10}$ and $R^{11}$ is hydrogen, the other being methyl, ethyl, difluoromethyl, fluoro, or chloro; or

$R^{10}$ and $R^{11}$ taken together are alkylidene, halomethylene, or ethylene; provided that when one of $R^{10}$ or $R^{11}$ is methyl or ethyl, $R^6$ (when at position 1 or 7) is other than alkyl.

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**3,978,117**

## PROCESS FOR CONVERTING STYRENE BOTTOMS TO NITROBENZOIC ACIDS

**John D. Bacha; Anatoli Onopchenko, both of Monroeville, and Johann G. D. Schulz, Pittsburgh, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed July 11, 1975, Ser. No. 595,158**

**Int. Cl.² C07C *51/33***

**U.S. Cl. 260—523 R** **6 Claims**

1. A process for converting styrene bottoms to a product predominating in para-nitrobenzoic acid which comprises nitrating said bottoms with nitric acid and then oxidizing the nitrated product with nitric acid, said nitration being conducted with an aqueous nitric acid solution having a concentration of about 40 to about 95 weight per cent at a temperature of about −20° to about 100° C. over a period of about 15 minutes to about 12 hours and said oxidation being conducted with an aqueous nitric acid solution having a concentration of about five to about 50 weight per cent at a temperature of about 160° to about 220° C. for about one-half to about 12 hours.

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**3,978,118**

## PROCESS FOR CONVERTING STYRENE OR POLYSTYRENE TO NITROBENZOIC ACIDS

**Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed July 11, 1975, Ser. No. 595,156**

**Int. Cl.² C07C *51/33***

**U.S. Cl. 260—523 R** **7 Claims**

1. A process for converting styrene or polystyrene to a product predominating in para-nitrobenzoic acid which comprises nitrating said compound with nitric acid and then oxidizing the nitrated product with nitric acid, said nitration being conducted with an aqueous nitric acid solution having a concentration of about 40 to about 95 weight per cent at a temperature of about −20° to about 100° C. over a period of 15 minutes to about 12 hours and said oxidation being conducted with an aqueous nitric acid solution having a concentration of about 5 to about 50 weight per cent at a temperature of about 160° to about 220° C. for about ½ to about 12 hours.

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**3,978,119**

## PROCESS FOR CONVERTING STILBENE OR BIBENZYL TO NITROBENZOIC ACIDS

**Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed July 11, 1975, Ser. No. 595,157**

**Int. Cl.² C07C *51/33***

**U.S. Cl. 260—523 R** **7 Claims**

1. A process for converting stilbene or bibenzyl to a product predominating in para-nitrobenzoic acid which comprises nitrating said compound with nitric acid and then oxidizing the nitrated product with nitric acid, said nitration being conducted with an aqueous nitric acid solution having a concentration of about 40 to about 95 weight per cent at a temperature of about −20° to about 100° C. over a period of about 15 minutes to about 12 hours and said oxidation being conducted with an aqueous nitric acid solution having a concentration of about 5 to about 50 weight per cent at a temperature of about 160° to about 220°C. for about one-half to about 12 hours.

## 3,978,120

## METHOD FOR THE PRODUCTION OF ALICYCLIC ANHYDRIDES

Giancarlo Sioli, Como; Luigi Giuffre, Milan; Franco Righi, Cesano Maderno, and Giancarlo Matera, Milan, all of Italy, assignors to Snia Viscosa Societa Nazionale Industries Applicazioni Viscosa S.p.A., Milan, Italy

Division of Ser. No. 118,951, Feb. 25, 1971, Pat. No. 3,914,313. This application Feb. 18, 1975, Ser. No. 550,262
The portion of the term of this patent subsequent to Oct. 21, 1992, has been disclaimed.
Int. Cl.² C07C *51/56*
U.S. Cl. 260—547 13 Claims

1. A method for the preparation of alicyclic anhydrides comprising

heating an unsubstituted alicyclic acid, which is of the type represented by a carbonyl grouping directly bound to a carbon atom of cycloaliphatic ring, at a temperature between 550°C and 750°C, and under a pressure of less than 100 mm. Hg. in a metallic reaction vessel made of a metal other than nickel, and in the presence of a catalyst which is an ester of phosphoric acid of the type $XP(OR)_3$, where X is selected from the group consisting of oxygen, sulphur and selenium, and R is an alkyl radical, and

fractionally condensing the gases and vapors obtained to recover the desired anhydride.

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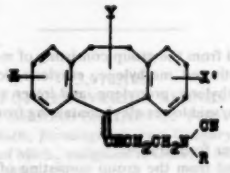
## 3,978,121

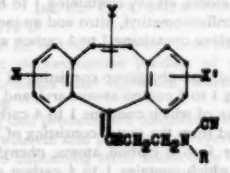
## 5H DIBENZO[A,D]CYCLOHEPTENE DERIVATIVES

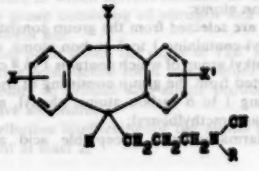
Edward L. Engelhardt, Gwynedd Valley, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

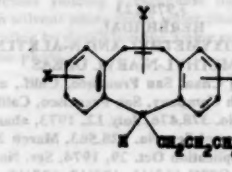
Division of Ser. No. 297,710, July 25, 1963, which is a continuation-in-part of Ser. No. 215,770, Aug. 9, 1972, abandoned, which is a continuation-in-part of Ser. No. 140,223, Sept. 25, 1961, abandoned, which is a continuation-in-part of Ser. No. 120,835, May 24, 1961, abandoned. This application Apr. 11, 1975, Ser. No. 567,165
Int. Cl.² C07C *125/08*
U.S. Cl. 260—551 C 7 Claims

1. A compound selected from the group consisting of:









wherein R is a lower alkyl radical, Y is selected from the group consisting of hydrogen and halogen and X and X′ are selected from the group consisting of hydrogen, an alkyl group having up to 6 carbon atoms, an alkenyl group having up to 6 carbon atoms, a perfluoroalkyl group having up to 4 carbon atoms, phenyl, an acyl group having up to 4 carbon atoms, a perfluoroacyl group having up to 4 carbon atoms, amino, an alkylamino group having up to 4 carbon atoms, a dialkylamino group having up to 8 carbon atoms, an acylamino group having up to 4 carbon atoms, a perfluoroacylamino group having up to 4 carbon atoms, an alkylsulfonylamino group having up to 4 carbon atoms, halogen, hydroxyl, an alkoxyl group having up to 4 carbon atoms, a perfluoroalkoxyl group having up to 4 carbon atoms, cyano carboxy, carboxyl, an alkylcarbamyl group having up to 5 carbon atoms, a dialkylcarbamyl group having up to 9 carbon atoms, a carbalkoxy group having up to 6 carbon atoms, mercapto, an alkylmercapto group having up to 4 carbon atoms, a perfluoroalkylmercapto group having up to 4 carbon atoms, an alkylsulfonyl group having up to 4 carbon atoms, a perfluoroalkylsulfonyl group having up to 4 carbon atoms, sulfamoyl, an alkylsulfamoyl group having up to 4 carbon atoms and a dialkylsulfamoyl group having up to 8 carbon atoms.

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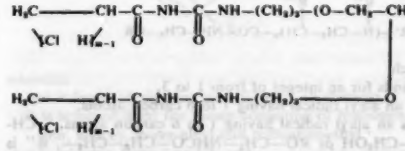
## 3,978,122

## ACYLUREA COMPOUNDS

Thomas Stauner, and Rolf Kyburz, both of Marly, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed May 2, 1974, Ser. No. 466,323
Claims priority, application Switzerland, May 7, 1973, 6429/73
Int. Cl.² C07C *127/22*
U.S. Cl. 260—553 E 4 Claims

1. An acylurea compound of the formula



wherein *m* is 1 or 2 and *n* denotes an integer having a value of 1 to 100.

## 3,978,123
## HERBICIDAL N-ALKYLSULFOXYMETHYL-AND-N-ALKYLSULFONYL-METHYL-N-ARYL UREAS

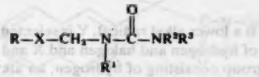
David Cheong King Chan, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 378,476, July 12, 1973, abandoned, Continuation-in-part of Ser. No. 128,563, March 26, 1971, abandoned. This application Oct. 29, 1974, Ser. No. 518,665

Int. Cl.[2] C07C *127/15*, *127/17*, *127/19*

U.S. Cl. 260—553 A 4 Claims

1. A compound of the formula



wherein R is alkyl of 1 to 6 carbon atoms, $R^1$ is phenyl substituted with from 0 to 2 fluorine or chlorine or 0 to 1 trifluoromethyl, $R^2$ is alkyl of 1 to 6 carbon atoms, $R^3$ is hydrogen or alkyl of 1 to 4 carbon atoms, and X is $S(O)_n$ wherein *n* is 1 or 2.

## 3,978,124
## 6-SUBSTITUTED 2-NAPHTHYL α-SUBSTITUTED ACETAMIDES

John H. Fried, and Ian J. Harrison, both of Palo Alto, Calif., assignors to Syntex Corporation, Panama, Panama

Division of Ser. No. 195,878, Nov. 4, 1971, Pat. No. 3,896,157, which is a division of Ser. No. 694,771, Dec. 7, 1967, abandoned, which is a continuation-in-part of Ser. No. 608,997, Jan. 13, 1967, abandoned. This application Mar. 17, 1975, Ser. No. 558,583

Int. Cl.[2] C07C *103/22*

U.S. Cl. 260—558 R 9 Claims

4. 6-Methoxy-2-naphthyl-α-methylacetamide.

9. 6-Methoxy-2-naphthyl-α-difluoromethylacetamide.

## 3,978,125
## CHEMICAL COMPOUNDS AND A PROCESS FOR MAKING POLYURETHANES WITH THE NEW COMPOUNDS AS A CATALYST

Erwin Müller, and Heinz Thomas, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

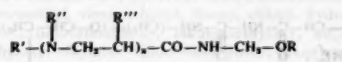
Filed May 3, 1974, Ser. No. 466,644

Claims priority, application Germany, May 12, 1973, 2324176

Int. Cl.[2] C07C *103/38*

U.S. Cl. 260—561 A 1 Claim

1. A chemical compound having the formula



in which

*n* stands for an integer of from 1 to 3,

R is an alkyl radical having 1 to 6 carbon atoms,

R′ is an alkyl radical having 1 to 6 carbon atoms, —$CH_2CH_2OH$ or $RO-CH_2-NHCO-CH_2-CH_2-$, R″ is an alkyl radical having 1 to 6 carbon atoms or —$CH_2-CH_2-OH$ and R‴ is H or $CH_3$.

## 3,978,126
## N-HYDROXY-AMIDINE COMPOUNDS

Harm Jan Panneman, Oss, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

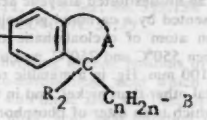
Filed July 15, 1974, Ser. No. 488,648

Claims priority, application Netherlands, Aug. 3, 1973, 7310741

Int. Cl.[2] C07C *123/00*

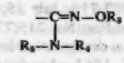
U.S. Cl. 260—564 G 10 Claims

1. A compound selected from the group consisting of a compound of the formula:

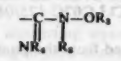


in which

B is N-hydroxy-amidino of the group consisting of



and



A is selected from the group consisting of methylene, lower alkyl-substituted methylene, ethylene, lower alkyl-substituted ethylene, propylene, and lower alkyl-substituted propylene, said lower alkyl containing from 1 to 6 carbon atoms;

*r* is an integer from 0 to 4;

$R_1$ is selected from the group consisting of hydroxy, alkyl containing 1 to 6 carbon atoms, alkylthio containing 1 to 6 carbon atoms, alkoxy containing 1 to 6 carbon atoms, halogen, trifluoromethyl, nitro and amino;

$C_nH_{2n}$ is alkylene containing 1 to 4 carbon atoms or a single bond;

$R_2$ is selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms, aryl, and phenylalkyl the alkyl group of which contains 1 to 4 carbon atoms;

$R_3$ is selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms, phenylalkyl the alkyl group of which contains 1 to 4 carbon atoms, and acyl derived from an organic carboxylic acid containing 1 to 18 carbon atoms;

$R_4$ and $R_5$ are selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms, and phenylalkyl the alkyl group of which contains 1 to 4 carbon atoms;

$R_6$ is selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms, phenyl, methylphenyl, benzyl, and methylbenzyl;

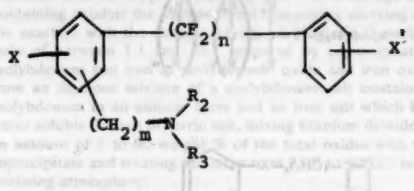
and the pharmaceutically acceptable acid addition salts thereof.

## 3,978,127
## TETRAFLUOROPHENETHYLARALKYLAMINE COMPOUNDS

Edward L. Engelhardt, Gwynedd Valley, and Marcia E. Christy, Perkasie, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 102,130, Dec. 28, 1970, Pat. No. 3,812,177, which is a continuation-in-part of Ser. No. 799,945, Feb. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 712,616, March 13, 1968, abandoned. This application May 16, 1974, Ser. No. 470,500
Int. Cl.² C07C 87/28
U.S. Cl. 260—570.5 R 28 Claims

1. Compounds having the formula



wherein

X and X′ are selected from the group consisting of hydrogen, an alkyl group having up to 6 carbon atoms, an alkenyl group having up to 6 carbon atoms, a perfluoroalkyl group having up to 4 carbon atoms, a phenyl or a substituted phenyl radical, amino, an alkylamino group having up to 4 carbon atoms, a dialkylamino group having up to 8 carbon atoms, fluorine, chlorine, bromine, iodine, hydroxyl, an alkoxyl group having up to 4 carbon atoms and a perfluoroalkoxyl group having up to 4 carbon atoms;

*n* is an integer selected from the group consisting of 2 and 3;

$R_2$ and $R_3$ are independently selected from the group consisting of hydrogen, alkyl, alkenyl, aralkyl and alkynyl, and *m* is an integer selected from the group consisting of 1 to 4 inclusive;

and pharmaceutically acceptable, non-toxic acid addition salts thereof.

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## 3,978,128
## METHOD OF RECOVERING AMINES BY THE HYDROLYTIC DECOMPOSITION OF POLYURETHANES

William C. Meluch, Birmingham, and Gregory A. Campbell, Romeo, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 13, 1975, Ser. No. 540,610
Int. Cl.² C07C 87/28
U.S. Cl. 260—570 D 3 Claims

1. In a process for recovering amines from the high temperature hydrolytic decomposition product of polyurethanes, which product contains water vapor and amines, the improvement comprising:

a. conducting said product to a continuous recycling spray condenser wherein said product is sprayed with an aqueous mixture containing from about 3 to about 20% by weight of an extracting polar aromatic solvent, the chemical structure of which solvent contains an atom selected from the group consisting of nitrogen and oxygen, and which solvent has:

1. a boiling point within the range of 120° to 300° C.,
2. a melting point below room temperature,
3. the ability to protect said amine products from degradative oxidation,
4. a distribution coefficient for the amine product with water of at least 2;

said condenser yielding a two-phase liquid comprising an amine rich solvent phase and a water phase; and

b. separating by distillation the amine component from said organic phase.

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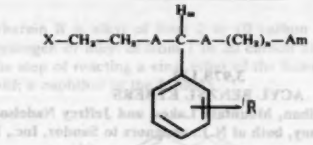
## 3,978,129
## ALKENYL- AND ALKANYLAMINES

William John Welstead, Jr., Richmond, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Filed Jan. 28, 1972, Ser. No. 221,825
Int. Cl.² C07C 87/28, 87/29
U.S. Cl. 260—570.5 R 9 Claims

1. A compound selected from alkenyl and alkanylamines having the formula:



wherein:

Am is selected from lower-alkylamino and di-lower-alkylamino.

A is selected from methylene and methylidyne,

R is selected from hydrogen, lower-alkyl, lower-alkoxy, halogen and trifluoromethyl,

*m* is selected from zero and one,

*n* is one and two,

X is halogen, and the pharmaceutically acceptable acid addition salts thereof.

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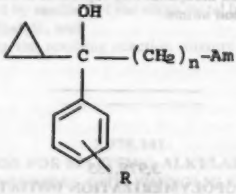
## 3,978,130
## 1-CYCLOPROPYL-1-PHENYL-ω-AMINO-1-ALKANOLS

William John Welstead, Jr., Richmond, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation-in-part of Ser. No. 221,804, Jan. 28, 1972, abandoned. This application Mar. 19, 1974, Ser. No. 452,578
Int. Cl.² C07C 91/22
U.S. Cl. 260—570.6 9 Claims

1. A compound selected from those having the formula:



wherein;

Am is lower-alkylamino and di-lower-alkylamino,

R is selected from the group consisting of hydrogen, halogen, alkoxy, lower-alkyl and trifluoromethyl,

*n* is selected from 2 and 3, and

the pharmaceutically acceptable salts thereof.

3,978,131

## PROCESS FOR PREPARING 4-AMINO-DIPHENYLAMINE

Dieter Pawellek; Edmund Bielendorfer, both of Leverkusen, and Karlfried Wedemeyer, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 22, 1974, Ser. No. 516,946

Claims priority, application Germany, Nov. 8, 1973, 2355737

Int. Cl.² C07C *85/02*

U.S. Cl. 260—576 9 Claims

1. Process for preparing 4-amino-diphenylamine which comprises hydrogenating 4-nitroso-diphenylamine dissolved in a water-immiscible solvent selected from the group of aniline, the toluidines, xylidines and their derivatives monoalkylated or dialkylated on the nitrogen atom and mixtures thereof in absence of a second, aqueous phase and in the presence of Raney nickel as a catalyst.

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3,978,132

## ACYL BENZYL ETHERS

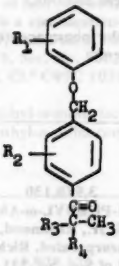
William J. Houlihan, Mountain Lakes, and Jeffrey Nadelson, Lake Parsippany, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 422,540, Dec. 6, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,358

Int. Cl.² C07C *49/84*

U.S. Cl. 260—590 D 7 Claims

1. A compound of the formula



where

$R_1$ and $R_2$ each independently represent hydrogen, halo having an atomic weight of about 19 to 36, or straight chain lower alkyl having 1 to 4 carbon atoms, and

$R_3$ and $R_4$ each independently represent lower alkyl having 1 to 2 carbon atoms.

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3,978,133

## PHOTOPOLYMERIZATION INITIATORS

Ralph H. Reiter, and George Rosen, both of Wayne, N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 455,667, March 28, 1974, Pat. No. 3,929,490. This application Nov. 18, 1974, Ser. No. 524,970

Int. Cl.² C07C *49/80*

U.S. Cl. 260—592 1 Claim

1. p-(Biphenylyl)-2,2,2-trichloroacetophenone.

3,978,134

## ETHER OF THIOETHER SUBSTITUTED BENZALDEHYDES

Hans-Peter Schelling, Oberwil, and Fritz Schaub, Basel, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

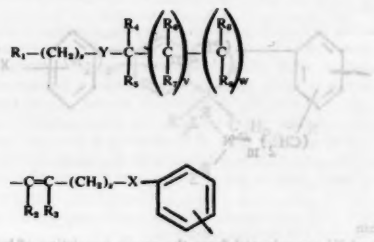
Continuation-in-part of Ser. No. 207,633, Dec. 13, 1971, Pat. No. 3,829,442. This application May 21, 1974, Ser. No. 471,938

Claims priority, application Switzerland, Dec. 14, 1970, 18472/70; Sept. 17, 1971, 13599/71; Oct. 6, 1971, 14521/71; Nov. 11, 1971, 16357/71

Int. Cl.² C07C *47/52*

U.S. Cl. 260—599 7 Claims

1. A compound of the formula:



$R_1$ is alkyl of 1 to 11 carbon atoms or an acrylic hydrocarbon of up to 11 carbon atoms having one or two double bonds or one triple bond,

$R_2$, $R_3$, $R_4$, $R_5$, $R_6$,$R_7$, $R_8$ and $R_9$, which may be the same or different, are each hydrogen, alkyl of 1 to 5 carbon atoms or alkenyl of 2 to 6 carbon atoms,

Y is oxygen or sulphur,

X is oxygen, sulphur, $-OCH_2-$ or $-SCH_2-$,

s, v and w, which may be the same or different, are each 0, or 1 and

Z is 1, 2 or 3.

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3,978,135

## PREPARATION OF ETHERS FROM CITRONELLAL OR HOMOLOGUES THEREOF

Pierre Chabardes, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

Continuation of Ser. No. 317,082, Dec. 20, 1972, abandoned. This application Apr. 15, 1975, Ser. No. 568,323

Claims priority, application France, Dec. 21, 1971, 71.45873; Oct. 16, 1972, 72.35673

Int. Cl.² C07C *47/20*, *45/02*

U.S. Cl. 260—602 6 Claims

1. A process for the preparation of a $C_1$–$C_6$ alkyl ether of hydroxydihydrocitronellal which comprises the following steps:

a. reacting citronellal with an aliphatic primary or secondary amine of 1 to 4 carbon atoms or ammonia at a temperature between −10°C and 40°C;

b. contacting the product of step (a) with an alkanol of 1 to 6 carbon atoms, containing at least one mole of a strong inorganic acid per mole of citronellal employed in step (a) at a temperature between −20°c. and +50°C.; and

c. neutralizing the reaction mixture obtained in step (b) with an alkaline reagent selected from the group consisting of alkali metal hydroxides and alkali metal carbonates.

3,978,136

## PROCESS FOR THE PRODUCTION OF A CATALYST SUITABLE FOR THE OXIDATION OF METHANOL TO FORMALDEHYDE

Heinz Friedrich, and Walter Neugebauer, both of Constance, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany

Division of Ser. No. 285,540, Aug. 31, 1972, Pat. No. 3,843,562. This application Mar. 14, 1974, Ser. No. 451,291

Claims priority, application Germany, Sept. 14, 1971, 2145851

Int. Cl.² C07C 45/16

U.S. Cl. 260—603 R 10 Claims

1. In a process of preparing formaldehyde by heat reacting methanol and an oxygen containing gas with a $MoO_3$:$Fe_2O_3$ containing catalyst the improvement comprising carrying out the reaction with the catalyst having an $MoO_3$:$Fe_2O_3$ weight ratio of between 1:1 and 10:1 prepared by coprecipitating molybdenum and iron as molybdenum oxide and iron oxide from an aqeuous mixture of a molybdenum salt containing molybdenum in an anionic form and an iron salt which is a water soluble ferrous or ferric salt, mixing titanium dioxide in an amount of 1 to 90 weight % of the total oxides with the coprecipitate and treating the mixture at 350° to 600°C. in an oxidizing atmosphere.

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3,978,137

## OXIDATION OF SULFUR-CONTAINING COMPOUNDS

Robert R. Frame, Glenview, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Mar. 14, 1975, Ser. No. 558,407

Int. Cl.² C07C 148/06

U.S. Cl. 260—608 23 Claims

1. A process for the oxidation of a sulfur-containing compound which comprises treating said sulfur-containing compound at oxidation conditions with an oxygen-containing gas in a medium possessing a pH in a range of from about a pH of 8 to about a pH of 14 in the presence of a catalyst system comprising a Group VIIB metal phthalocyanine and a Group VIII metal phthalocyanine in a ratio of from about 1 to about 6 mols of the Group VIIB metal phthalocyanine per mol of the Group VIII metal phthalocyanine to decrease the uptake of oxygen, and recovering the resultant oxidized sulfur-containing compound.

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3,978,138

## PROCESS FOR PREPARING P-DIISOPROPYL-BENZENEDIHYDROPEROXIDE

Tadahisa Yanagihara; Toshikuni Koga, and Kentaro Fukahori, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo, Japan

Filed Oct. 18, 1974, Ser. No. 515,870

Claims priority, application Japan, Oct. 29, 1973, 48-120692

Int. Cl.² C07C 179/02

U.S. Cl. 260—610 B 14 Claims

1. In a process for preparing p-diisopropylbenzenedihydroperoxide by contacting p-diisopropylbenzene with molecular oxygen in an aqueous, emulsified reaction mixture, separating p-diisopropylbenzenedihydroperoxide from the reaction mixture and recycling a non-aqueous residual solution containing p-diisopropylbenzene and p-diisopropylbenzene monohydroperoxide, the improvement which comprises:

contacting said reaction mixture with a $C_{5-12}$ hydrocarbon precipitating medium thereby precipitating said p-diisopropylbenzenedihydroperoxide from said reaction mixture and forming an aqueous phase and a medium solution containing said precipitating medium, p-diisopropylbenzene and p-diisopropylbenzene monohydroperoxide;

contacting the medium solution separated from the p-diisopropylbenzene-dihydroperoxide precipitate with a solid alkali metal hydroxide or a solid alkaline earth metal hydroxide at room temperature to 90°C;

evaporating the precipitating medium; and

recycling the residual solution.

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3,978,139

## PROCESS OF PREPARING NAPHTHYL ACETALS

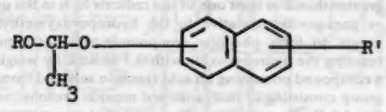
Thomas J. Sheerin, Edison, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,874

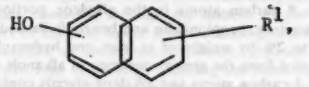
Int. Cl.² C07C 41/06

U.S. Cl. 260—613 D 7 Claims

1. A process for making a compound of the formula



wherein R is alkyl of from 2 to 10 carbon atoms and R' is hydrogen or alkyl of from 1 to 20 carbon atoms, comprising the step of reacting a vinyl ether of the formula $ROCH{=}CH_2$ with a naphthol of the formula



wherein R and $R^1$ are as defined above in the presence of an aliphatic monocarboxylic acid having 1 to 20 carbon atoms.

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3,978,140

## PROCESS FOR THE PREPARATION OF CARBINOLS

Clinton Fisher Lane, Franklin, and Hal Leslie Myatt, Milwaukee, both of Wis., assignors to Aldrich-Boranes, Inc., Milwaukee, Wis.

Filed Sept. 23, 1974, Ser. No. 508,281

Int. Cl.² C07C 29/00

U.S. Cl. 260—617 C 1 Claim

1. A process for the preparation of a carbinol whereby an aliphatic, alicyclic or aromatic carboxylic acid or carboxylic acid anhydride, an alkali metal borohydride and a boron trihalide are brought together simultaneously or sequentially, in tetrahydrofuran containing dimethyl sulfide in which diborane is soluble as a labile borane adduct and with all components present about in the stoichiometrical amounts required for reduction of the carboxylic acid or carboxylic acid anhydride group to an alcohol group and having present during the reduction the alkali metal tetrahaloborate or alkali metal halide formed by reaction of the alkali metal borohydride with the boron trihalide, and

hydrolyzing the resulting reaction mixture to produce the carbinol.

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3,978,141

## PROCESS FOR SPLITTING ALKYLAROMATIC HYDROPEROXIDES INTO PHENOLIC COMPOUNDS

Michel Jouffret, Francheville-le-Bas, France, assignor to Rhone-Poulenc S.A., Paris, France

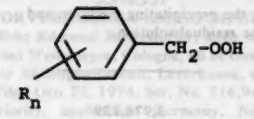
Filed Aug. 28, 1974, Ser. No. 501,434

Claims priority, application France, Aug. 31, 1973, 73.1525

Int. Cl.² C07C 39/06

U.S. Cl. 260—621 C 10 Claims

1. In a process for the deperoxidization of a primary alkylaromatic hydroperoxide of the general formula:



in which:

R represents an alkyl radical containing 1 to 4 carbon atoms and *n* represents an integer from 1 to 3, with the proviso that when *n* is equal to 1 the radical R, or when *n* is greater than 1 at least one of the radicals R, is in the ortho or para-position relative to the hydroperoxymethylene group, to form phenolic compounds which comprises reacting the hydroperoxide with 0.1 to 40% by weight of a compound possessing an acid reaction selected from the group consisting of inorganic and organic protonic acids, Friedel-Crafts catalysts, silica, and diatomaceous earth acid catalysts at a temperature from 20°C to 110°C in the presence of an inert organic solvent, the improvement wherein said solvent comprises:

a. 40 to 98% by weight of at least one aprotic polar solvent selected from the group consisting (1) polymethylenesulphones, (2) alkylene glycol carbonates which contain 2 to 4 carbon atoms in the alkylene portion and (3) acetonitrile, propionitrile and benzonitrile and

b. 60 to 2% by weight of at least one hydroxylic solvent selected from the group consisting of alkanols containing 1 to 3 carbon atoms and alkylene glycols containing 2 to 4 carbon atoms, whereby the selectivity of the deperoxidization is increased with respect to the phenolic compounds.

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**3,978,142**

## PROCESS FOR PRODUCING POLYPHENOLS

**Ward J. Burkholder, Baton Rouge, La., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Jan. 14, 1974, Ser. No. 433,393**

**Int. Cl.² C07C *37/08***

**U.S. Cl. 260—621 C** **17 Claims**

1. In a process wherein an aralkyl tertiary polyhydroperoxide is obtained by the oxidation of an aryl tertiary alkane with an oxygen containing gas at elevated temperatures and there are produced, in addition to said aralkyl tertiary polyhydroperoxide, aralkyl tertiary monohydroperoxide, and certain by-products, and wherein an oxidation product fraction containing said polyhydroperoxide is separated from the oxidation reaction product and at least a portion of the resultant recycle stream containing unreacted aryl tertiary alkane, aralkyl tertiary monohydroperoxide, a minor amount of said polyhydroperoxide and said by-products is separated into a first lighter fraction containing primarily said monohydroperoxide and aryl tertiary alkane and a second heavier fraction containing substantially all of said polyhydroperoxide, and at least a portion of said by-products, the remaining portion of said recycle stream being recycled to said oxidation, the improvement comprising; introducing a portion of said second fraction into a rearrangement zone employing an acid catalyst and cleaving at least a portion of said polyhydroperoxide contained therein to the corresponding polyphenol.

**3,978,143**

## PROCESS FOR PREPARING DIARYLDINITROETHYLENES

**Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed May 27, 1975, Ser. No. 581,087**

**Int. Cl.² C07C *79/10***

**U.S. Cl. 260—645** **10 Claims**

1. A process for converting a 1,1-bis(alkylphenyl)ethane to the corresponding 1,1-bis(alkylphenyl)-2,2-dinitroethylene which comprises heating a mixture of said 1,1-bis(alkylphenyl) ethane, nitric acid and water wherein the numerical product of multiplication of the concentration of nitric acid in said mixture and the ratio of the absolute mols of nitric acid to the mols of said 1,1-bis(alkylphenyl)ethane is above 150 and up to about 1000.

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**3,978,144**

## MANUFACTURE OF O-BENZYLTOLUENES

**Heinz Eilingsfeld, Frankenthal, and Manfred Patsch, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

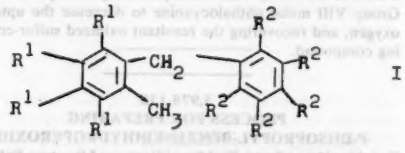
**Filed July 12, 1974, Ser. No. 488,003**

**Claims priority, application Germany, July 17, 1973, 2336289**

**Int. Cl.² C07C *17/00*, *25/18***

**U.S. Cl. 260—649 R** **9 Claims**

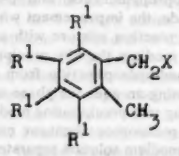
1. In a process for the manufacture of o-benzyltoluenes of the formula



I

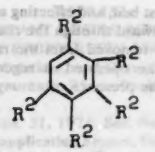
wherein $R^1$ is hydrogen, chlorine or bromine, $R^2$ is hydrogen, chlorine, bromine, alkyl of 1 to 6 carbon atoms, phenyl or phenyl substituted by alkyl of 1 to 4 carbon atoms, by reaction of an o-xylyl halide with an aromatic compound, the improvement which comprises:

reacting an o-xylyl halide of the formula



II

wherein $R^1$ has the above meanings and X is bromine or chlorine with a benzene of the formula



III

wherein $R^2$ has the above meanings, in the presence of boron trifluoride or derivatives thereof in the form of its dihydrate or its adducts or complex compounds with ethanol, phosphoric acid or diethyl ether and in the presence of an oxygen-containing acid which forms an adduct with the above boron compounds the said acid being selected from the group consisting of phosphoric acids, sulphonic acids, acids containing boron, propionic acid, butyric acid, oxalic acid, formic acid, acetic acid and adipic acid.

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**3,978,145**

## USE OF HEXAGONAL CHROMIUM (111) OXIDE HYDROXIDE CATALYST IN FLUORINATION PROCESS

**Joachim F. Knaak, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 14, 1974, Ser. No. 523,710**

**Int. Cl.² C07C *17/08*, *17/20***

**U.S. Cl. 260—653.6** **5 Claims**

1. In the vapor phase reaction of a halogenated aliphatic compound containing halogen atoms other than fluorine, the compound containing from 1 to 8 carbon atoms in which adjacent carbon atoms are linked by one or two valence bonds and the compound being selected from halogenated aliphatic hydrocarbons, perhaloacetones, perhaloacetyl halides, perhaloacetonitriles and trihaloacetaldehydes, the compound being reacted with HF over a chromium (III) oxide catalyst at a temperature of about from 150° to 700°C. to produce halogenated aliphatic compounds containing increased numbers of fluorine atoms, the improvement wherein the catalyst is hexagonal chromium (III) oxide hydroxide.

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**3,978,146**

## PRODUCTION OF 2-CHLOROBUTADIENE-1,3

**Alexander Ohorodnik, Erftstadt-Liblar; Udo Dettmeier, Okriftel; Klaus Gehrmann, Hurth-Knapsack, and Heinz-Josef Beras, Hurth-Berrenrath, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

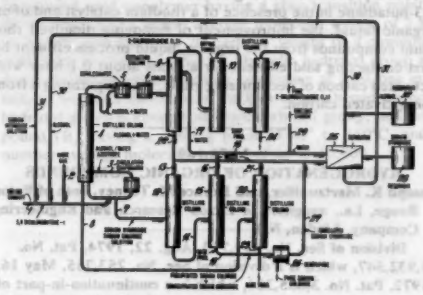
**Continuation of Ser. No. 277,853, Aug. 4, 1972, abandoned. This application Feb. 10, 1975, Ser. No. 548,420**

**Claims priority, application Germany, Aug. 7, 1971, 2139729**

**Int. Cl.² C07C *21/21***

**U.S. Cl. 260—655** **8 Claims**

1. A process for the manufacture of 2-chlorobutadiene-(1,3) by the dehydrochlorination of 3,4-dichlorobutene-(1) in an aqueous solution of an alkali metal or alkaline earth metal hydroxide in the presence of an alcohol having 2–4 carbon atoms at elevated temperature, and distilling off resulting 2-chlorobutadiene-(1,3), which comprises continuously supplying the lower part of a circulation reaction zone with 3,4-dichlorobutene-(1), an alcohol and the aqueous hydroxide solution, the resulting reaction mixture containing between 10 and 90% by volume of alcohol, and heating the mixture to boiling therein; continuously delivering from the reaction zone resulting 2-chlorobutadiene-(1,3) together with an alcohol/water-azeotrope to a first distilling zone comprising a dephlegmatory zone; maintaining the said dephlegmatory zone at a temperature between 35°C. and 50°C., and continuously distilling off in said first distilling zone the said 2-chlorobutadiene-(1,3) and the said azeotrope, the alcohol/water-azeotrope being selectively condensed and recycled to said first distilling zone; condensing the resulting vaporous, crude and alcohol-containing 2-chlorobutadiene-(1,3) and introducing it into an extraction zone; scrubbing the 2-chlorobutadiene-(1,3) therein with water flowing countercurrently with respect thereto, drying it and fractionating it until pure; retaining in the reaction zone a reaction mixture which separates into an upper layer and a lower layer; continuously removing an aqueous hydroxide/alcohol solution in excess from said



upper layer through an overflow and recovering the alcohol; continuously removing through the bottom of the reaction zone a part of the said lower layer consisting of an aqueous alkaline solution of unreacted hydroxide, chloride salt and minor proportions of alcohol; distilling the removed part of the lower layer so as to concentrate it; isolating precipitated chloride salt, and recovering concentrated liquor.

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**3,978,147**

## PROCESS FOR THE PREPARATION OF OPTICALLY ACTIVE CARBON COMPOUNDS

**Günther Wilke; Borislav Bogdanovic, and Horst Pauling, all of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H, Mulheim (Ruhr), Germany**

**Continuation-in-part of Ser. No. 166,957, July 28, 1971, abandoned. This application Nov. 7, 1973, Ser. No. 413,722**

**Claims priority, application Germany, Aug. 6, 1970, 2039125**

**Int. Cl.² C07C *3/00***

**U.S. Cl. 260—666 A** **8 Claims**

1. Process for preparing optically active compounds which comprises reacting optically inactive unsaturated olefinic compounds at a temperature from −120° to +100°C in the presence of a catalyst prepared by combining a nickel compound selected from the group consisting of nickel halides, nickel salts of organic acids, nickel alcoholates, nickel enolates, nickel phenolates and π-allyl nickel halides, a Lewis acid selected from the group consisting of aluminum alkyls, aluminum alkyl halides and aluminum halides and an optically active phospine having the formula

$$PR'R''R'''$$

wherein R′, R″ and R‴ are paraffinic, naphthinic, olefinic acetylinic or aromatic hydrocarbon radicals, said optically active phosphine being:

A. One wherein the phosphorus atom has a chiral center, in which case R′, R″ and R‴0 represent three different radicals which are bonded to the phosphorus and one of the enantiomers thereof has been obtained by racemate cleavage; or

B. One wherein one of said radicals itself is optically active and in turn is bonded to the phosphorus atom to form a compound $PR^*_{3-n}R_n$ wherein R* is an optically active hydrocarbon radical,

thereby forming optically active compounds having chiral centers formed by the carbon-to-carbon linkages.

3,978,148

## PROCESS FOR REMOVAL OF RHODIUM COMPOUNDS FROM PROCESS STREAMS

Joel David Citron, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 21, 1975, Ser. No. 597,492
Int. Cl.² Co7E *11/12*
U.S. Cl. 260—680 B 11 Claims

1. In a process for making 1,4-hexadiene from ethylene and 1,3-butadiene in the presence of a rhodium catalyst and of an organic liquid, the improvement of removing dissolved rhodium compounds from the organic, liquid process effluent by first contacting said effluent for at least about 0.1 hour with activated carbon of decolorizing grade, then separating it from the activated carbon.

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3,978,149

## HYDROGENATION OF ORGANIC COMPOUNDS

Joseph K. Mertzweiller, and Horace M. Tenney, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 499,793, Aug. 22, 1974, Pat. No. 3,932,547, which is a division of Ser. No. 253,765, May 16, 1972, Pat. No. 3,855,324, which is a continuation-in-part of Ser. No. 880,933, Nov. 28, 1969, Pat. No. 3,711,423, which is a continuation-in-part of Ser. No. 674,098, Oct. 10, 1967, abandoned. This application July 17, 1975, Ser. No. 596,584
Int. Cl.² C07C *5/08*
U.S. Cl. 260—683.9 16 Claims

1. A process for the hydrogenation of a feed containing heptyne comprising the steps of:

forming a catalyst by

impregnating a support containing at least about 0.1 millimoles of hydroxyl groups per gram of support, said support comprising alumina with an aqueous solution of a transition metal salt comprising nickel acetate;

heat-treating the impregnated support at a temperature of at least about 500°F.;

activating the heat-treated impregnated support by contacting same with an organometallic compound having the formula: $QR_n$, wherein Q is selected from Group I, II or III metals of the Periodic Chart of the Elements, R is selected from the group consisting of hydride and alkyl, aryl, alkaryl, aralkyl and cycloalkyl radicals containing from 1 to about 20 carbon atoms and wherein n ranges from 1 to 3 and satisfies the valence of Q;

treating the activated supported metal complex in the presence of hydrogen at a temperature of at least about 300°F.;

and thereafter contacting said catalyst with said feed in the presence of a hydrogen-containing gas, thereby producing a hydrogenation reaction.

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3,978,150

## CONTINUOUS PARAFFIN DEHYDROGENATION PROCESS

Frederick G. McWilliams, Jr., Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

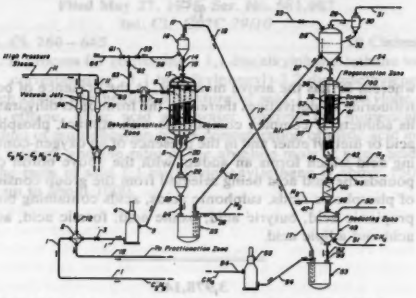
Filed Mar. 3, 1975, Ser. No. 554,389
Int. Cl.² C07C *5/32*
U.S. Cl. 260—683.3 5 Claims

1. A catalytic dehydrogenation process which comprises the steps of:

a. passing a feed stream comprising saturated normal paraffins into a reaction zone maintained at dehydrogenation conditions including a temperature in excess of 1000°F. and a subatmospheric pressure, contacting the feed stream with a bed of dehydrogenation catalyst and effecting the formation of a reaction zone effluent stream comprising olefinic hydrocarbons and hydrogen;

b. intermittently removing a quantity of used catalyst from the bottom of the bed of dehydrogenation catalyst, and intermittently adding a quantity of active catalyst to the top of the catalyst bed, and effecting a gradual movement of catalyst downward through the reaction zone;

c. passing catalyst removed from the reaction zone into a regeneration zone operated at regeneration conditions which include the presence of an oxygen-containing gas



stream and a superatmospheric pressure and effecting the production of regenerated catalyst; and,

d. passing regenerated catalyst into a reducing zone operated at reduction conditions which include the presence of a reducing gas and effecting the production of active catalyst which is added to the catalyst bed.

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3,978,151

## HIGH-FUNCTIONAL POLYMERCAPTAN RESINS IN EPOXY/ANHYDRIDE RESIN COMPOSITIONS

Douglas H. Strong, Mentor, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation of Ser. No. 322,366, Jan. 10, 1973, abandoned. This application Sept. 27, 1974, Ser. No. 509,750
Int. Cl.² C08L *63/00, 63/02, 63/04*
U.S. Cl. 260—830 S 5 Claims

1. The method of preparing a cured, epoxy resin composition, wherein said epoxy resin will cure at elevated temperature with tertiary amine catalyst to a hard product, which preparation is achieved through accelerated and autogenous curing to said hard product at the situs of the application of the composition and at the ambient, non-elevated temperature of said situs, said method comprising:

1. blending together a uniform composition of continuous liquid phase and free from said amine catalyst, said composition having reactants that participate in the curing consisting essentially of:

A. substance selected from the group consisting of polyglycidyl ether of a polyhydric phenol having a ratio of hydroxyl groups to 1,2-epoxy groups of not above about 2.5:2, cycloaliphatic epoxides, polyglycidyl ethers of novalac resin, and mixtures thereof;

B. polycarboxylic acid anhydride in an amount sufficient to provide about 0.5–2 anhydride groups per 1,2-epoxy group, which amount of anhydride is uniformly dispersed in said continuous liquid phase; and

C. liquid polymercaptan resin having an average SH functionality of greater than 2.5 and an average molecular weight between about 300–5,000, said resin being present in uniform dispersion in said liquid phase and in a catalytic amount within the range of from above about 3 to about 150 weight parts per 100 weight parts of said (A) component, with said polymercaptan resin having hydroxyl functionality in addition to said SH functionality; and

2. applying the resulting uniform composition while permitting autogenous curing of same at the ambient temperature of the situs of application to thereby prepare said hard product.

3,978,152

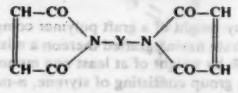
## HEAT-RESISTANT RESINS DERIVED FROM A BIS-IMIDE, AN EPOXY RESIN AND A POLYAMINE

Max Gruffaz, La Mulatiere, and Gerard Lefebvre, Lyon, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Jan. 31, 1975, Ser. No. 545,968
Claims priority, application France, Feb. 4, 1974, 74.03614
Int. Cl.² C08G 45/06; G08G 45/12
U.S. Cl. 260—830 P 12 Claims

1. Process for preparing a polymer possessing imide groups, which comprises reacting at a temperature of at least 50°C.:

a. a bis-imide of the formula:



(I)

in which Y represents a divalent hydrocarbon radical with 2 to 20 carbon atoms which is free from unsaturated bonds other than aromatic bonds, a divalent mono- or bis-heterocyclic radical with 2 to 10 carbon atoms, or a divalent organic radical with 4 to 20 carbon atoms consisting of several of the hydrocarbon radicals defined above connected to one another by —O—, —S—, —CO— or —$SO_2$—, and

b. either an adduct (A) obtained by reacting at a temperature from 50° to 200°C. a resin containing more than one 1,2-epoxy group and a polyamine of the general formula:

$$Z(-NH_2)_v \quad \text{(II)}$$

in which Z represents an organic radical of valency $v$ and $v$ represents an integer at least equal to 2, or a mixture comprising the adduct (A) and an amine of the formula:

$$X(-NH_2)_m \quad \text{(III)}$$

in which X represents an organic radical of valency $m$ and $m$ represents an integer at least equal to 1, the proportions of the reagents being such that if on the one hand, with regard to the adduct (A) $n_1$ denotes the number of $-NH_2$ groups of the polyamine of formula (II) and $n_3$ denotes the number of epoxy groups of the epoxy resin, and, on the other hand $n_2$ denotes the number of carbon-carbon double bonds in the bis-imide of formula (I) and $n_4$ denotes the total number of $-NH_2$ groups in component (b) the ratio $n_1/n_2$ is greater than 1 and the ratio $n_3/n_4$ is between 1 and 10.

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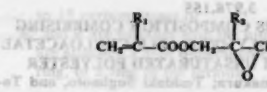
3,978,153

## POWDER COATING COMPOSITION

Mikio Sato, Fuji; Kazuo Toyomoto, Yokohama; Jyoji Ibata, Fuji; Kazuhiro Suzuoki, Fuji; Yoshio Matsumoto, Fuji; Shunji Matsuo, Fuji; Yashio Hayashi, Fuji, and Bunzo Uda, Fuji, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 17, 1975, Ser. No. 587,683
Claims priority, application Japan, June 18, 1974, 49-68704; July 23, 1974, 49-83795; Aug. 5, 1974, 49-88981
Int. Cl.² C08L 63/00
U.S. Cl. 260—835 7 Claims

1. A powder coating composition which comprises (A) 100 parts by weight of a copolymer obtained by copolymerizing 5 to 30 % by weight of a compound represented by the general formula



wherein $R_1$ and $R_2$ stand for a hydrogen atom or a methyl group,

with 95 to 70 % by weight of a vinyl compound other than said compound, said copolymer having a glass transition point of 30° to 90°C. and a weight average molecular weight of 2,500 to 30,000, and (B) 3 to 70 parts by weight of a compound containing in the molecule one phenolic hydroxyl group and one carboxyl group and further containing at least one ester linkage between the benzene nucleus to which said phenolic hydroxyl group is bonded and said carboxyl group, said compound (B) having a melting point of 45° to 160°C. and a number average molecular weight of up to 10,000.

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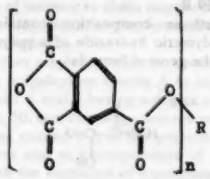
3,978,154

## PROCESS FOR THE MANUFACTURE OF IMPROVED ELASTOMERS PREPARED BY REACTION OF TRIMELLITOYL-FUNCTIONAL POLYMER WITH EPOXY COMPOUND

Toshio Yukuta; Takao Aoki; Takashi Ohashi, all of Kodaira; Kouichi Iwami, Kunitachi, and Akira Suzuki, Tanashi, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 245,611, April 19, 1972, abandoned. This application Aug. 16, 1974, Ser. No. 498,224
Claims priority, application Japan, Apr. 22, 1971, 46-25654
Int. Cl.² C08L 63/00
U.S. Cl. 260—835 12 Claims

1. Process for the manufacture of an elastomer comprising the steps of mixing (A) at least one trimellitoyl-functional polymer represented by the formula:



in which R represents a residue of an hydroxyl-functional polymer and $n$ is an integer of at least 2, said trimellitoyl-functional polymer being prepared by the reaction of an hydroxyl-functional polymer having a number average molecular weight higher than 700, and having at least two hydroxy groups at the chain ends of the side chain, with trimellitic anhydride or a derivative thereof; (B) at least one polyglycidyl ether of bisphenol A; and (C) at least one acid anhydride compound having a molecular weight lower than 700, and having at least one acid anhydride group, and proceeding with curing at an elevated temperature and wherein the low molecular weight acid anhydride compound is added in the amount of 0.5 to 2.0 equivalents relative to 1 equivalent of the acid anhydride group of the trimellitoyl-functional polymer, and the total amount of the trimellitoyl-functional polymer and the low molecular weight acid anhydride compound is such that the equivalent ratio of total acid anhydride groups of the trimellitoyl-functional polymer and the low molecular weight acid anhydride compound to the epoxy groups of the epoxy compound is 0.5 to 1.5.

3,978,155

## CURABLE RESINOUS COMPOSITION COMPRISING COMBINATION OF POLYMERIZABLE CYCLOACETAL COMPOUND WITH UNSATURATED POLYESTER

Eiichiro Takiyama, Kamakura; Toshiaki Sugimoto, and Toshiaki Hanyuda, both of Yokohama, all of Japan, assignors to Showa High Polymer Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 536,912
Int. Cl.² C08L 63/10, 67/06
U.S. Cl. 260—836 1 Claim

1. A curable resinous composition which comprises

I. 10–95% of a curable resinous compound prepared by reacting (a) 1 mol of an unsaturated polycycloacetal selected from the group consisting of diallylidene pentaerythritol and triallylidene sorbitol, (b) 0.1 to 3 mols of an ester selected from the group consisting of hydroxyethyl methacrylate, hydroxypropyl methacrylate, hydroxyethyl acrylate, hydroxypropyl acrylate, trimethylolpropanedimethacrylate, trimethylolpropanediacrylate, trimethylolethanedimethacrylate, trimethylolethanediacrylate, glycerinedimethacrylate, glycerinediacrylate, pentaerythritoltriacrylate and pentaerythritoltrimethacrylate and (c) a positive amount, up to 2.9 mols, of a polyhydroxy compound selected from the group consisting of polyhydric alcohols, polyethylene glycol, polypropylene glycol, a polyethylene glycol/polypropylene glycol block polymer, a hydroxy polyester having a terminal or branch chain hydroxyl group and polybutadiene having a terminal hydroxy group, and

(II) an unsaturated polyester selected from the group consisting of (1) unsaturated alkyds, (2) an epoxy acrylate prepared from a mixture containing an epoxy compound an unsaturated mono carboxylic acid and (3) mixtures thereof.

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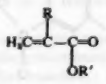
3,978,156

## COLOR STABILIZED POLYURETHANES

Richard Ghrist Parker, Hudson, and Philip Carlos Kelley, Brecksville, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed May 14, 1975, Ser. No. 577,332
Int. Cl.² C08L 75/04
U.S. Cl. 260—859 R 11 Claims

1. A polyurethane composition containing stabilizing amounts of a polymeric hydrazide of a polymer of an alkyl acrylate having the general formula



wherein R is hydrogen or alkyl containing 1 to 4 carbon atoms and R′ is an alicyclic group containing 1 to 12 carbon atoms, a phenolic stabilizer and an ultraviolet absorber.

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3,978,157

## THERMOPLASTIC COMPOSITIONS COMPRISING AROMATIC POLYCARBONATE URETHANES

Ludwig Bottenbruch; Wolfgang Alewelt, and Josef Merten, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 12, 1975, Ser. No. 549,366
Claims priority, application Germany, Feb. 16, 1974, 2407567; July 27, 1974, 2436258
Int. Cl.² C08L 75/12; C08F 18/24
U.S. Cl. 260—859 R 4 Claims

1. A thermoplastic composition comprising

I. from 30 to 70 parts by weight of a thermoplastic aromatic polycarbonate urethane obtained by reacting a low molecular weight aromatic polycarbonate having terminal chloroformic acid ester groups and a degree of polymerization $P_n$ of from 1 to 20 with from 1 to 15 mol %, based on the quantity of dihydroxy compound cocondensed in the polycarbonate during the production thereof, of at least one disecondary aliphatic, cycloaliphatic or aromatic diamine and

II. from 70 to 30 parts by weight of a composition comprising

a. from 0 to 100% by weight of a polymer of at least one monomer selected from the group consisting of styrene and α-methylstyrene or a copolymer of at least one monomer selected from the group consisting of styrene and α-methylstyrene with at least one other monomer selected from the group consisting of acrylonitrile, methacrylonitrile, acrylic acid ester and methacrylic acid ester and

b. from 100 to 0% by weight of a graft polymer comprising a rubber substrate having grafted thereon a mixture of from 95 to 50% by weight of at least one monomer selected from the group consisting of styrene, α-methylstyrene and methylmethacrylate and from 5 to 50% by weight of at least one monomer selected from the group consisting of acrylonitrile and methacrylonitrile.

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3,978,158

## THERMOPLASTIC RESIN COMPOSITIONS

Eiichi Yonemitsu, Kashiwa; Seiichi Kamiyama, Tokyo; Toshiaki Kanada, Tokyo, and Takeshi Hattori, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Feb. 26, 1974, Ser. No. 446,077
Claims priority, application Japan, Feb. 26, 1973, 48-22178
Int. Cl.² C08L 67/06
U.S. Cl. 260—873 7 Claims

1. A thermoplastic resin composition comprising (A) a bis(hydroxyaryl)alkanic polycarbonate and (B) a rubber-modified polychlorostyrenic resin; said resin (B) having been prepared by latex-blending (a) a graft polymer latex having been prepared by emulsion-polymerizing (a) 20 to 70 parts by weight of a vinylic monomer mixture comprising mainly chlorostyrene and further a vinyl cyanide in the presence of (b) 80 to 30 parts by weight of a rubber constituent derived from a conjugated dienic monomer, and (2) a copolymer latex having been prepared by emulsion-polymerizing a vinylic monomer mixture comprising mainly chlorostyrene and a vinyl cyanide; said resin (B) containing 1 to 15% by weight polymer structure derived from conjugated dienic monomer (b), 43 to 94% by weight polymer structure derived from chlorostyrene and 5 to 25% by weight polymer structure derived from a vinyl cyanide.

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3,978,159

## THERMOPLASTIC MOULDING COMPOSITIONS OF TRIAZINE-CONTAINING POLYCONDENSATES AND GRAFT POLYMERS

Dieter Neuray, Rumeln-Kaldenhausen; Hugo Vernaleken; Dieter Margotte, both of Krefeld, and Josef Merten, Korschenbroich, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Apr. 21, 1975, Ser. No. 570,010
Claims priority, application Germany, Apr. 24, 1974, 2419767
Int. Cl.² C08L 67/06
U.S. Cl. 260—873 7 Claims

1. A thermoplastic moulding composition comprising

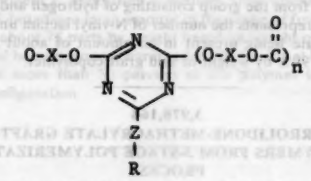
A. from 15 to 80 % by weight of an aromatic polycondensate containing s-triazine rings and

B. from 20 to 85 % by weight of a graft polymer obtained by polymerizing onto a diene or acrylate rubber a mixture of

i. from 50 to 90 % by weight of at least one monomer selected from the group consisting of styrene, α-methyl styrene and methyl methacrylate and

ii. from 10 to 50 % by weight of at least one monomer selected from the group consisting of acrylonitrile, methacrylonitrile and methyl methacrylate,

the mixture as a whole containing from 5 to 25 % by weight of s-triazine rings and 5 to 40 % by weight of rubber, based on (A) and (B) and said aromatic polycondensate (A) containing s-triazine rings having recurring structural units corresponding to the formula

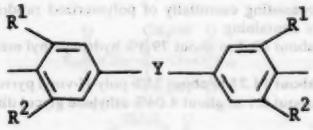


(1)

wherein

*n* is a number from 1 to 20;

X is an optionally monosubstituted or polysubstituted o, m or p-phenylene radical or a radical of the formula

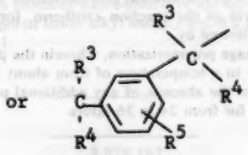


(2)

wherein

$R^1$ and $R^2$, which may be the same or different, are hydrogen, $C_1$–$C_4$-alkyl or halogen and

Y is a single bond, a $C_1$–$C_7$-alkylene or alkylidene radical, a $C_5$–$C_{12}$-cycloalkylene or cycloalkylidene radical, —O—, —S—, —CO—, —SO—, —$SO_2$—,



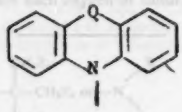
wherein

$R^3$ and $R^4$, which may be the same or different, are hydrogen or $C_1$–$C_4$-alkyl and

$R^5$ is hydrogen, $C_1$–$C_4$-alkyl or halogen;

Z is a single bond, —O—, —S—, —NH— or —$NR^6$— and R and $R^6$ are each separately hydrogen, $C_1$–$C_8$-alkyl, $C_2$–$C_8$-alkenyl, $C_5$–$C_6$-cycloalkyl, an optionally substituted aryl radical having up to 14 carbon atoms or alkaryl having up to 15 carbon atoms or

$R^6$ and R are together with the nitrogen atom to which they are attached a 5- or 6-membered aliphatic or heterocyclic ring, or a ring of the formula



wherein

Q is a single bond, methylene, —O— or —S—.

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**3,978,160**

## MANUFACTURE OF LOW MOLECULAR WEIGHT BLOCK COPOLYMERS OF VINYL OR DIENE MONOMERS AND ALKYLENE OXIDES

**Erhard Seiler, Ludwigshafen; Gerhard Fahrbach, Schwetzingen, and Dieter Stein, Limburgerhof, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed July 30, 1973, Ser. No. 383,894**

**Claims priority, application Germany, Aug. 2, 1972, 2237954**

**Int. Cl.² C08L *23/00, 33/04***

**U.S. Cl. 260—874** **11 Claims**

1. A process for the manufacture of low molecular weight block copolymers which comprises:

a. polymerizing vinyl or diene monomers selected from the group consisting of butadiene, isoprene, styrene, methyl methacrylate, methyl-substituted styrene, chloro-substituted styrene or mixtures thereof in a first stage to form a block B, said polymerization being carried out in the presence of an organometallic compound which acts as an initiator and in the presence of an alkylene oxide which acts as a chain stopper, said vinyl or diene monomer and said alkylene oxide being added together or separately to a solution of said initiator, the molar ratio of monomer to initiator being greater than 1:1 and the molar ratio of initiator to chain stopper being greater than or equal to 1:1; and, after the formation of said block B has been completed,

b. adding further alkylene oxide in a second stage to add one or two polyalkylene blocks A to said block B, each of said blocks A and B having a degree of polymerization of from 2 to 50, said first stage and second stage polymerization being carried out in the presence of an inert organic solvent and at a temperature of from −120°C to +100°C with the exclusion of atmospheric oxygen.

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**3,978,161**

## METALATION OF POLYMERS

**Stuart D. Nielsen, Stow; Ivan G. Hargis, Tallmadge, and Russell A. Livigni, Akron, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 402,439, Oct. 1, 1973, abandoned. This application July 29, 1975, Ser. No. 600,177**

**Int. Cl.² C08L *51/00, 53/00;* C08F *6/00, 8/00***

**U.S. Cl. 260—877** **6 Claims**

1. The method for metalating a hydrocarbon polymer having aliphatic ethylenic unsaturation and having replaceable hydrogen atoms in the polymer chain which comprises reacting said polymer in solution in a liquid hydrocarbon solvent which is essentially free of aliphatic unsaturation and of sodium oxide with metallic sodium in admixture with a hydrocarbon polytertiary amine free of aliphatic unsaturation and having from 2 to 4 tertiary nitrogen atoms as a chelating agent at a temperature of from about 0° to 100°C. and for a time sufficient to effect bonding of said sodium to said polymer by means of a direct carbon to sodium bond, said chelating agent

being used in an amount of from about 0.1 to 2.5 moles per gram atom of said sodium and said chelating agent being unreactive with the carbanion formed on said polymer.

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3,978,162

## PROCESS FOR PRODUCING VINYL CHLORIDE GRAFT COPOLYMERS

Kakusaburo Nakanishi, Uozu, and Tatsuro Yoshida, Namerikawa, both of Japan, assignors to Ryo-Nichi Co., Ltd., Japan

Filed July 7, 1975, Ser. No. 593,508
Int. Cl.² C08F 2/18, 255/06; C08L 23/28
U.S. Cl. 260—878 R 6 Claims

1. A process for producing a vinyl chloride graft copolymer wherein vinyl chloride is graft-polymerized to an ethylene-propylene-diene copolymer thereby to obtain a vinyl chloride graft copolymer containing 10 – 60% by weight of the ethylene-propylene-diene copolymer, comprising carring out said graft-polymerization in the form of suspension polymerization in aqueous phase in the presence of an aliphatic alcohol of not less than 8 carbon atoms.

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3,978,163

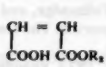
## GRAFT COPOLYMERS OF A POLY (N-VINYL LACTAM) CONTAINING/UNSATURATED ETHYLENIC/AND DIBASIC CARBOXYLIC ACID MONOESTER SIDECHAINS AND STABLE EMULSIONS OF SUCH GRAFT COPOLYMERS

Eugene S. Barabas, Watchung, and Marvin M. Fein, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Continuation of Ser. Nos. 313,138, Dec. 7, 1972, abandoned, and Ser. No. 322,560, Jan. 10, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,207
Int. Cl.² C08L 31/02, 25/18
U.S. Cl. 260—885 8 Claims

1. A graft copolymer derived from a monomer mixture comprising, approximately by weight.

a. 5 to 50% of a monomer having the formula

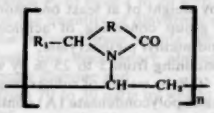


wherein $R_2$ is selected from the group consisting of substituted and unsubstituted $C_1$–$C_{18}$ alkyl, $C_3$–$C_8$ cycloalkyl, substituted and unsubstituted $C_6$–$C_{15}$ aryl; and

b. 5 to 95% of an unsaturated ethylenic monomer having the formula

$CH_2$=CH—X

wherein X is a moiety selected from the group consisting of an ester, aldehyde, ketone, halogen, ether, nitrile, isocyanate, sulfate and its salts, an N-containing heterocycle, and an aromatic hydrocarbon containing from 6 to about 20 carbon atoms, the monomers of said monomer mixture having been grafted on a poly (N-vinyl lactam) substrate having the formula



wherein R represents an alkylene bridge group containing from 2 to 4 carbon atoms, $R_1$ represents a member sefected from the group consisting of hydrogen and methyl and *n* represents the number of N-vinyl lactam units, said substrate being present in an amount of about 10% to about 90% by weight of said graft copolymer.

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3,978,164

## PYRROLIDONE-METHACRYLATE GRAFT COPOLYMERS FROM 3-STAGE POLYMERIZATION PROCESS

Albert R. Le Boeuf, Sturbridge, and William R. Grovesteen, West Dudley, both of Mass., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Nov. 21, 1974, Ser. No. 526,022
Int. Cl.² C08L 31/02
U.S. Cl. 260—885 10 Claims

1. A contact lens composition which can be subjected to cutting and thereafter hydrated in a buffered saline solution to provide a dimensionally-stable contact lens having from about 45 to about 65% water after hydration, said composition in dry form consisting essentially of polymerized random graft copolymers containing:

1. from about 62.7 to about 79.3% hydroxyethyl methacrylate;
2. from about 14.25 to about 35% poly-N-vinyl pyrrolidone;
3. from about 0.1 to about 4.04% ethylene glycol dimethacrylate;
4. from about 0.1 to about 2.5% methacrylic acid;
5. from about 0.1 to about 5.0% water;
6. from about 0 to about 4.0 ppm, based on the weight of hydroxyethyl methacrylate monomer, of hydroquinone inhibitor; and
7. from about 50 to 250 ppm, based on the weight of hydroxyethyl methacrylate monomer, of the methyl ether of hydroquinone, as an inhibitor;

said composition having been polymerized in a three-stage polymerization process comprising:

a. a first stage, using only a low temperature polymerization inhibitor, with substantially all the oxygen having been removed from the polymerization mix prior to and during the polymerization reaction; the initial polymerization reaction being conducted at from about 23° to aout 30°C., for from about 16 to about 36 hours, with the heat of the reaction continuously absorbed to control the reaction exotherm; followed by

b. a second stage, wherein the product of (a) is heated to a temperature of from about 40° to about 80°C. in the absence of any additional polymerization initiator, without control of the reaction exotherm, for from 2 to 6 hours; followed by

c. a third stage polymerization, wherein the product of (b) is heated to a temperature of from about 105° to about 125°C., in the absence of any additional polymerization initiator, for from 24 to 36 hours.

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3,978,165

## ELASTOMERIC BLEND

Nelson A. Stumpe, Jr., and Henry E. Railsback, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 14, 1975, Ser. No. 567,957
Int. Cl.² C08L 9/00, 47/00
U.S. Cl. 260—894 6 Claims

1. A rubbery composition of matter comprising a blend of three components, A, B and C, wherein:

component A comprises a rubbery homopolymer of 1,3-butadiene in an amount in the range of from about 10 to about 60 parts by weight based on weight of the blend, said homopolymer characterized by having at least 35 percent of the polymer in the cis configuration;

component B comprises a rubbery copolymer of 1,3-butadiene and styrene in an amount in the range of from about 15 to about 65 parts by weight based on weight of the blend; and

component C comprises a medium vinyl homopolymer of 1,3-butadiene in an amount in the range of from about 25 to about 75 parts by weight based on weight of the blend, said homopolymer characterized by having at least 30 but not more than 50 percent of the polymer in the vinyl configuration.

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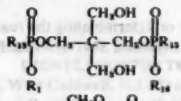
## 3,978,166
## CYCLIC PHOSPHONATES

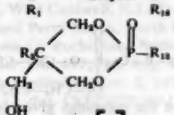
**Ingenuin Hechenbleikner, West Cornwall, Conn., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed Apr. 7, 1975, Ser. No. 565,699**
**Int. Cl.² E05F 11/00; C09J 3/00**
**U.S. Cl. 260—927 R** **24 Claims**

1. A monomeric phosphonate having a formula selected from the group consisting of:



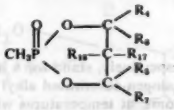
[1]



[2]

[3]

or



[4]

where $R_1$ is alkyl, alkenyl or aralkyl, $R_{13}$ is normal alkyl of 3 to 4 carbon atoms or the residue of a monohydric alcohol having a pKa below that of n-propyl alcohol from which the OH is removed, $R_{14}$ is as defined for $R_1$ or $R_{13}$, $R_2$ is alkyl of 1 to 17 carbon atoms or hydroxymethyl, $R_4$, $R_5$, $R_6$, $R_7$, $R_8$ and $R_9$ are hydrogen or lower alkyl and $R_{17}$ and $R_{18}$ are lower alkyl and s is 0 or 1.

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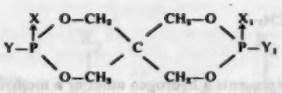
## 3,978,167
## PENTAERYTHRITOL CYCLIC DIPHOSPHATES AND DIPHOSPHORAMIDATES

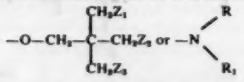
**James A. Albright, Ann Arbor, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.**

**Continuation-in-part of Ser. No. 429,607, Jan. 2, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 616,935**
**Int. Cl.² C07F 9/09, 9/165, 9/24**
**U.S. Cl. 260—927 R** **22 Claims**

1. A compound of the formula



where X and $X_1$ are each oxygen or sulfur and Y and $Y_1$ are each



where $Z_1$ and $Z_2$ are independently selected from fluorine, chlorine, bromine, iodine, and hydrogen and wherein $Z_3$ is selected from fluorine, chlorine, bromine, and iodine and where R and $R_1$ are each aliphatic, halogenated aliphatic, aromatic or halogenated aromatic hydrocarbon groups containing not more than about 12 carbon atoms, said halogenated groups having up to about 6 halogen substituents per group.

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## 3,978,168
## O,O,O',O'-TETRAMETHYL O,O'-TRITHIODI-P-PHENYLENE ESTER

**Michael Stanley Schrider, South Bound Brook, and Stephen David Levy, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Apr. 21, 1975, Ser. No. 570,293**
**Int. Cl.² C07C 9/06; A01N 9/36**
**U.S. Cl. 260—930** **1 Claim**

1. The compound phosphorothioic acid, 0,0,0',0'-tetramethyl 0,0'-trithiodi-p-phenylene ester.

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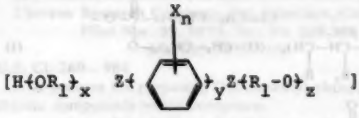
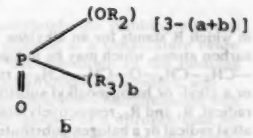
## 3,978,169
## POLYOL PHOSPHATES

**Georges Nagy, Montrouge; Daniel Balde, Levallois-Perret; Lucien Sobel, Paris, and Ludovic Parvi, Pont de Claix (Isere), all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

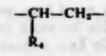
**Continuation-in-part of Ser. No. 17,353, Aug. 1, 1969, abandoned. This application Feb. 3, 1975, Ser. No. 546,450**
**Int. Cl.² C07F 9/11; C08J 9/00**
**U.S. Cl. 260—944** **1 Claim**

1. A composition of matter comprising compounds of the general formula





wherein X is a halogen atom, $R_1$ is an alkylene group of the formula



in which $R_4$ represents a hydrogen atom or a methyl, ethyl or halomethyl group; $R_3$ is an unsubstituted or halogen or hydroxyl substituted $C_1$–$C_6$ alkyl, phenyl, $C_1$–$C_6$ alkylphenyl, or phenyl($C_1$–$C_6$ alkyl) group, $R_2$ is a haloalkyl group containing from 2 to 4 carbon atoms, Z is an oxygen atom or a group of the formula

in which $R_5$ is a hydrogen atom or an unsubstituted or hydroxyl substituted $C_1$–$C_6$ alkyl, phenyl, $C_1$–$C_6$ alkylphenyl, or phenyl($C_1$–$C_6$ alkyl) group, *a* is an integer from 1 to 3, *b* is equal to 0 or 1, provided, however, that when *a* is 3, *b* is 0, *x* is an integer from 1 to 5, *y* is an integer from 2 to 5, *z* is an integer from 1 to 5 and *n* is an integer from 1 to 4.

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**3,978,170**

## PROCESS FOR THE MANUFACTURE OF 1,4-DIAMINO-HALOGEN AND PHOSPHORUS

**Hartfrid Vollmer, Erftstadt Liblar; Franz-Josef Dany, Erftstadt Lechenich, and Joachim Wortmann, Turnich, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

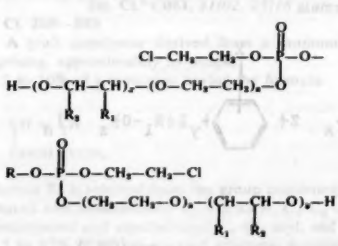
**Filed Nov. 6, 1974, Ser. No. 521,529**

**Claims priority, application Germany, Nov. 9, 1973, 2356034**

**Int. Cl.² C07F 9/09**

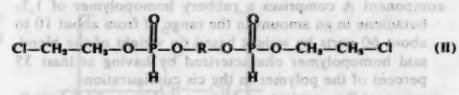
**U.S. Cl. 260—968** **9 Claims**

1. A process for making polyols containing halogen and phosphorus of the following general formula (I)



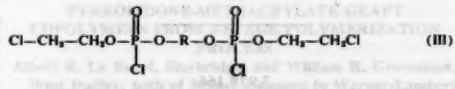
(I)

in which R stands for an alkylene radical having from 2 to 6 carbon atoms, which may be halogen-substituted, if desired, a —$CH_2$—$CH_2$—O—$CH_2$—$CH_2$— radical, a phenylene radical or a alkyl- or halogenoalkyl-substituted diphenylene methane radical, $R_1$ and $R_2$, respectively, stand for a hydrogen atom, an alkyl radical or a halogen-substituted alkyl radical having from 1 to 4 carbon atoms, $x + y$ stand for a number between 0.1 and 3, and *n* stands for 1 or 2, which process comprises reacting a compound of the general formula (II)



(II)

in which R stands for a alkylene radical or a halogen-substituted alkylene radical having from 2 to 6 carbon atoms, a —$CH_2$—$CH_2$—O—$CH_2$—$CH_2$— radical, a phenylene radical or an alkyl- or halogenoalkyl-substituted diphenylenemethane radical, with at least stoichiometric proportions of chlorine gas, at temperatures within the range about 0° and 5°C, in the presence of a solvent, wherein hydrogen chloride gas is difficultly soluble, and thereby transforming the formula (II) into a general formula (III) compound

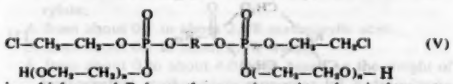


(III)

completing the reaction and removing then the chlorine gas in excess or resulting hydrogen chloride by introducing an inert gas into the reaction solution; and, while the introduction of inert gas is continued, admixing the reaction solution dropwise at temperatures within the range of about 15° and 40°C with stoichiometric proportions of a diol of the general formula (IV)

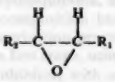
(IV)

in which *n* stands for 1 or 2; terminating the reaction; distilling off the solvent and subjecting the resulting product of the general formula (V)



(V)

in which *n* and R have the meanings given hereinabove, to epoxidation with at least stoichiometric proportions of a compound of the general formula (VI)



(VI)

in which $R_1$ and $R_2$, respectively, stand for a hydrogen atom, an alkyl radical or a halogen-substituted alkyl radical having from 1 to 4 carbon atoms, at temperatures within the range about 60° and 140°C for as long a period as necessary to provide for a continuous epoxide reflux, and separating epoxide in excess by distillation or by the introduction of an inert gas.

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**3,978,171**

## PROCESS FOR THE PREPARATION OF DIENYLPHOSPHATES

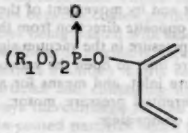
**Kaspar F. Burri, West Caldwell, N.J.; Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 497,598, Aug. 15, 1974, Pat. No. 3,933,948. This application Oct. 2, 1975, Ser. No. 618,863**

**Int. Cl.² C07F 9/113**

**U.S. Cl. 260—969** **5 Claims**

1. A process for the preparation of a compound of the formula



wherein $R_1$ is lower alkyl, aryl or benzyl,
which comprises contacting 3,4-dichlorobutanone with a compound of the formula

$(R_1O)_3P$

wherein $R_1$ is as above,
at an initial temperature of from about 0° to about 50°C followed by heating at a temperature between about 50° and 150°C.

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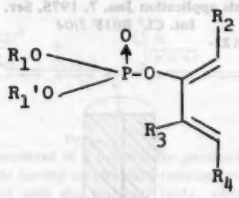
3,978,172

## PROCESS FOR THE PREPARATION OF DIENYLPHOSPHATES

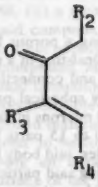
Kaspar F. Burri, West Caldwell, N.J.; Frank Kienzle, Therwill, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 497,598, Aug. 15, 1974, Pat. No. 3,933,948. This application Oct. 2, 1975, Ser. No. 618,865
Int. Cl.² C07F 9/113
U.S. Cl. 260—973 7 Claims

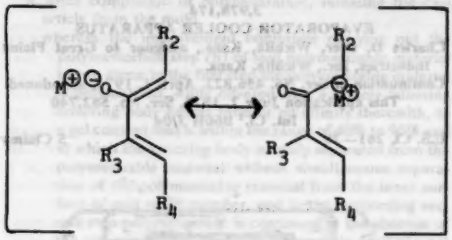
1. A process for the preparation of a compound of the formula



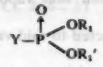
wherein each of $R_1$ and $R_1'$ is lower alkyl, aryl or benzyl and each of $R_2$, $R_3$ and $R_4$ is hydrogen or lower alkyl which comprises converting a compound of the formula



wherein $R_2$, $R_3$ and $R_4$ are as above, to its enolate of the formula



wherein $R_2$, $R_3$ and $R_4$ are as above and $M^+$ is the cation of sodium, potassium or lithium, by treatment with a strong organic soluble alkali metal amide base in an inert organic solvent and treating said enolate with a compound of the formula



wherein $R_1$ and $R_1'$ are as above and Y is chlorine, bromine or iodine, at a reduced temperature.

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3,978,173

## PREPARATION OF O,S-DIMETHYL PHOSPHOROAMIDOTHIOATES

Gustave K. Kohn, Berkeley; Irene C. Huang, Castro Valley, and William G. Toland, San Rafael, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Nov. 29, 1974, Ser. No. 528,300
Int. Cl.² C07F 9/24
U.S. Cl. 260—984 11 Claims

1. A process for preparing O,S-dimethyl phosphoroamidothioate compounds which comprises:

a. reacting substantially equimolar amounts of (1) methyl phosphorodichloridite, (2) methyl sulfenyl chloride and a lower alkanoic acid, in the liquid phase under essentially anhydrous reaction conditions at a temperature of about −75° to 25°C;

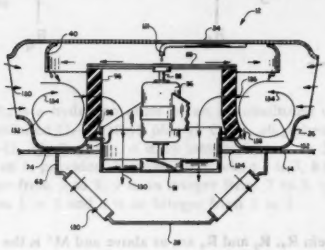
b. removing essentially completely the resulting alkanoyl chloride and hydrogen chloride at a temperature below about 25°C to prevent decomposition of the resulting O,S-dimethyl phosphorochloridothioate product; and

c. reacting the O,S-dimethyl phosphorochloridothioate with a substantially equimolar amount of a nitrogen base selected from ammonia, a lower alkylamine or lower dialkylamine, in the liquid phase in the presence of an acid acceptor at a temperature below about 25°C under essentially anhydrous reaction conditions.

## 3,978,174
## EVAPORATOR COOLER APPARATUS

Charles D. Peer, Wichita, Kans., assignor to Great Plains Industries, Inc., Wichita, Kans.

Continuation of Ser. No. 456,822, April 1, 1974, abandoned. This application June 2, 1975, Ser. No. 582,740
Int. Cl.² B60H 3/04
U.S. Cl. 261—29 5 Claims



1. An evaporator cooler apparatus connected to a vehicle, comprising:

a. a housing means having an annular air inlet section mounted about a central air outlet section;

b. a vaporizer means mounted in said housing means, an annular mixing chamber area between said vaporizer means and said air inlet section;

c. A fluid supply means operably connected to said vaporizer means to supply fluid thereto;

d. said vaporizer means having a power driven, rotatable vaporizer member to receive fluid from said fluid supply means and expell therefrom in fine particles toward said air inlet section and into said mixing chamber;

e. said vaporizer means having an annular filter member mounted between said air inlet section and said air outlet section; said filter member positioned below and adjacent said vaporizer member;

f. said mixing chamber positioned outwardly of and positioned about said vaporizer member, and said air inlet section positioned outwardly of said vaporizer member;

whereby air from said inlet section thoroughly mixes with the fine water particles to form a vortex action and achieve complete saturation of the inlet air prior to discharge through said filter member and said air outlet section.

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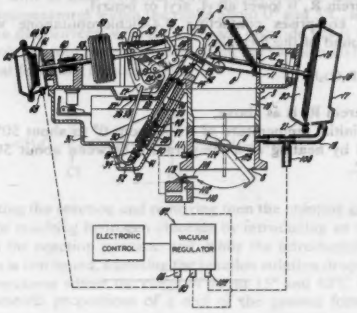
## 3,978,175
## ENGINE AIR-FUEL RATIO CONTROL MEANS

Donald D. Stoltman, Henrietta, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed May 12, 1975, Ser. No. 576,618
Int. Cl.² F02M 7/22
U.S. Cl. 261—50 A 3 Claims

1. Air-fuel ratio control apparatus for an internal combustion engine capable of providing a normal range of air-fuel ratios and an air-fuel ratio separate from said normal range on the rich side thereof, the engine including means for providing air and fuel in a ratio varying inversely with a vacuum signal, means for generating the vacuum signal, the vacuum signal generating means having a first pressure inlet, a second pressure inlet, a vacuum signal outlet, a differential pressure motor connected across the first pressure inlet and vacuum signal outlet and movable in response to the differential pressure thereacross, valve means actuable by movement of the differential pressure motor to a central position to close the vacuum signal outlet from both the first and second inlet, the valve means being further actuable by movement of the differential pressure motor in one direction from the central position due to decreasing pressure in the vacuum signal outlet relative to the first pressure inlet to open the vacuum signal outlet to the first pressure inlet and by movement of the differential pressure motor in the opposite direction from the central position due to increasing pressure in the vacuum signal outlet relative to the first pressure inlet to open the vacuum signal outlet to the second pressure inlet, and means for applying a varying force to the differential pressure motor; the air-fuel ratio control apparatus comprising:

a source of constant vacuum connected to the first pressure inlet; a source of vacuum greater than the constant vacuum normally connected to the second pressure inlet, whereby the vacuum signal is normally responsive to the varying force to control the engine air-fuel ratio within its normal range; and means for supplying air at atmospheric pressure to the second pressure inlet in place of the greater vacuum, whereby atmospheric pressure is provided at the vacuum signal outlet and the air and fuel providing apparatus provides air and fuel in the separate ratio.

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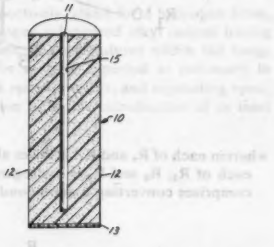
## 3,978,176
## SPARGER

Douglas W. Voegeli, Shoreview, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 286,112, Sept. 5, 1972, abandoned. This application Jan. 7, 1975, Ser. No. 539,088
Int. Cl.² B01F 3/04
U.S. Cl. 261—122 6 Claims




1. A sparger comprising a porous body provided with gas inlet means, said body consisting of a matrix of cured thermosetting resin containing and connecting a mass of uniformly sized, solid, substantially spherical particles of a size in the range of about 30 to 900 microns in diameter, said resin being present in amount of 10 to 15 parts by weight for each 100 parts by weight of particles, said body being formed by consolidation of the resin coating said particles and confluent at the points of contact of said particles which particles are uniformly coated over their entire surfaces with said resin in solid state and are adhered in the presence of an inert lubricant under pressure just sufficient to adhere the coated particles at

points of contact with each other without causing flow of resin to fill the interstices between coated particles, the surfaces of said joined particles being coated with said resin to substantially the same thickness as originally deposited thereon and the cured resin defines a unitary matrix surrounding each of said spherical particles and containing numerous interconnecting passageways therethrough formed by the interstices between said resin-coated particles which passageways function as means for conducting gaseous flow from the said inlet means through said porous body to the surfaces thereof.

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**3,978,177**

## PROCESS FOR THE PRODUCTION OF GRAPHITE MOLDING POWDER

**Hans Huschka, Grossauheim; Werner Heit; Franz-Josef Herrmann, both of Niederrodenbach, and Gerhard Spener, Hanau, all of Germany, assignors to Hobeg Hochtemperaturreaktor-Brennelement GmbH, Germany**

**Filed Sept. 25, 1974, Ser. No. 509,343**

**Claims priority, application Germany, Sept. 26, 1973, 2348282**

**Int. Cl.² G21C *21/00***

**U.S. Cl. 264—.5** **9 Claims**

1. A process of preparing a fuel insert, fuel element or absorber element comprising mixing (1) graphite powder, (2) phenol and (3) formaldehyde or a source thereof, heating the mixture to a temperature sufficient to cause (2) and (3) to react and form a molding powder and encasing a member of the group consisting of nuclear fuel particles, fertile particles and absorber particles in the molding powder.

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**3,978,178**

## PROCESS FOR PRODUCING ABRASION-RESISTANT CAST ARTICLE

**Akira Oshima; Kazunori Abe, and Nobuo Kameda, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed May 9, 1974, Ser. No. 468,577**

**Claims priority, application Japan, Apr. 30, 1974, 49-48550**

**Int. Cl.² B29D *7/02, 9/00***

**U.S. Cl. 264—25** **18 Claims**

1. An improvement in a process for producing a synthetic resin cast article having an abrasion-resistant polymer surface layer integrated with the polymer body, which process includes the steps of:

a. spreading onto all or part of the inner surface of a mold member a liquid polymerizable material selected from (i) a compound having a total of at least two acryloxy ($CH_2$=CH.CO.O—) and/or methacryloxy ($CH_2$=C($CH_3$).CO.O—) groups in the molecule, and having a molecular weight of at least 150, (ii) a mixture comprising at least 30% by weight of said compound and at most 70% by weight of at least one other copolymerizable monoethylenically unsaturated compound, and (iii) a partially polymerized product of said compound or said mixture,

b. polymerizing the polymerizable material to an extent such that the polymerized material is not swollen with or dissolved in a monomer to be formed into the polymer body, thereby forming an abrasion-resistant polymer layer on the inner surface of the mold member,

c. charging a mixture of the monomer for the polymer body and a polymerization initiator into the mold and then, polymerizing the monomer, and

d. after completion of polymerization, releasing the cast article from the mold,

wherein the improvement comprises carrying out the polymerization step (b) of said polymerizable material in two steps; in the first step the polymerizable material is polymerized, while covered with a closely adhering covering body having little or no affinity therewith, to a gel content that is within the range of 40% to 95% and at which the covering body is easily separated from the polymerizable material without simultaneous separation of the polymerizable material from the inner surface of said mold member, and in the succeeding second step polymerization is continued in the absence of the covering body with exposure to air until the gel content increases by 0.5% to 60% and reaches at least 90% and to an extent such that the polymerized material is not swollen with or dissolved in the monomer to be formed into the polymer body, the polymerization in the second step being completed prior to step (c),

and wherein said first and second steps are carried out in the presence of a photosensitizer capable of activating the polymerizable material with light of a predominant wave length of from 3,000 to 4,000 A.

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**3,978,179**

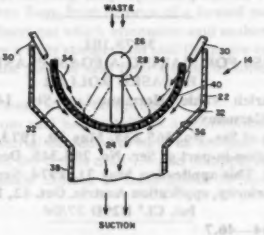
## PRODUCTION OF NON-WOVEN FABRICS

**Hermann O. Sundhauss, Lexington, Mass., assignor to Reprocess Textile Associates, Lexington, Mass.**

**Filed Sept. 4, 1973, Ser. No. 393,786**

**Int. Cl.² D04H *1/12, 1/54, 5/06***

**U.S. Cl. 264—37** **13 Claims**




1. A method of preparing a non-woven textile fabric from non-woven textile fabric waste which contains a thermoplastic binder resin, comprising cutting the non-woven textile fabric waste to a particle size of about ¾ inch to 1 inch in a first stage, hammer milling said cut waste to a size of about 3/16 inch to ⅜ inch in a second stage, blending said reduced waste with textile fibers of fiber length greater than ¾ inch, and forming the resulting blend into a non-woven web.

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**3,978,180**

## METHOD OF PRODUCING A NON-COMBUSTIBLE MOLDING MATERIAL

**Harutoshi Ueda, Osaka; Naoyuki Suzuki, Nara, and Masami Nagao, Takatsuki, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 406,611, Oct. 15, 1973, which is a continuation-in-part of Ser. No. 183,077, Sept. 23, 1971, abandoned. This application Sept. 26, 1974, Ser. No. 509,737**

**Claims priority, application Japan, Sept. 24, 1970, 45-84199; Sept. 24, 1970, 45-84200; Sept. 25, 1970, 45-84468; Oct. 22, 1970, 45-93221; Nov. 16, 1970, 45-101231; Dec. 28, 1970, 46-126941; Dec. 29, 1970, 46-124120**

**Int. Cl.² B29D *27/00*; C04B *7/356, 31/06, 31/08***

**U.S. Cl. 264—42** **9 Claims**

1. A process for producing a non-combustible molded article, which comprises:

i. mixing uniformly a molding composition consisting essentially of

a. 100 parts by weight of a hydraulic inorganic mixture consisting of an inorganic substance composed predominantly of silica selected from the group consisting of quartz rock, silica sand, aplite, pottery stone, silicate terra alba, diaspore, diatomaceous earth, fly ash, perlite, obsidian perlite, pumice microballoon, foamed shale pumice, foamed clay and vermiculite; and an inorganic substance composed predominantly of a source of calcium oxide selected from the group consisting of slaked lime, quick lime and calcium carbonate, the molar ratio of the inorganic substance composed predominantly of calcium oxide to the inorganic substance composed predominantly of silica being from 0.5 to 1.2;

b. 10 to 200 parts by weight of mineral fibers selected from chrysotile asbestos, amosite asbestos, crocidolite asbestos, amphibole asbestos, tremolite asbestos, actinolite asbestos, rock wool, glass fiber and slag wool;

c. 0.5 to 5 parts by weight of bitumen selected from the group consisting of coal tar, petroleum tar, ceresine and petrolatum; and

d. 300 to 200 parts by weight per 100 parts by weight of the total amount of components (a), (b) and (c), of water,

ii. molding the mixture so obtained,

iii. dehydrating the molded article at a pressure of at least 50 kg/cm$^2$ to a moisture content of 5 to 50% by weight, and

iv. heating the molded article to harden it at a temperature of 150°–210°C and at a vapor pressure of 5 to 20 atmospheres.

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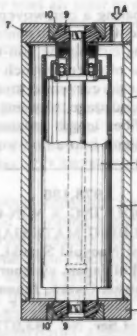
## 3,978,181
## PROCESS FOR MAKING A FOAM PLASTIC RESIN ENCASED ROLLER

**Klaus-Heinrich Vahle, Hermann-Lons-Str. 14, Bad Oeynhausen, Germany**

**Division of Ser. No. 365,235, May 30, 1973, which is a continuation-in-part of Ser. No. 204,345, Dec. 12, 1971, abandoned. This application May 31, 1974, Ser. No. 475,023**
**Claims priority, application Austria, Oct. 12, 1970, 9134/70**
**Int. Cl.$^2$ B29D** *27/04*
**U.S. Cl. 264—46.7** **8 Claims**




1. A method of making a foamed plastic encased idler roll comprising the steps of assembling together an assembly composed of a shaft rotatable through 360°, and at each end of said shaft lubricated bearing means, bearing support means, labyrinth means surrounding said shaft between said bearing means and the ends of said shaft, sealing disk means surrounding said shaft on the opposite side of said bearing means from said labyrinth means, and spacer ring means surrounding each end of said shaft adjacent said sealing disc means,

coaxially surrounding said assembly between said spacer ring means with a tubular body means to form an idler roll subassembly,

placing said subassembly coaxially within a cylindrical mold cavity to thereby define an annular space between the surface of said mold cavity and the surface of said tubular body means,

depositing a foamable thermosetting reaction mixture into said annular space,

permitting said mixture to foam and cure, and unite with said idler roll subassembly to form a foam-encased idler roll,

and removing said foam plastic-encased idler roll from said mold after said foamable mixture has cured.

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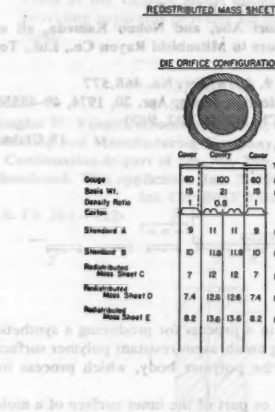
## 3,978,182
## METHOD FOR EXTRUDING A POLYSTYRENE FOAM WITH VARIATIONS IN MASS CONCENTRATION ACROSS THE SHEET AND THERMOFORMING THE SHEET

**Vinod K. Luthra, East Rochester, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 427,974, Dec. 26, 1973, abandoned. This application Feb. 4, 1974, Ser. No. 439,513**
**Int. Cl.$^2$ B29C** *17/03;* **B29D** *27/00;* **B29F** *3/04*
**U.S. Cl. 264—51** **3 Claims**




1. In a method for the extrusion and subsequent thermoforming of polystyrene foam sheet material, the improvement which comprises, extruding polystyrene foam sheet material to produce an extrudate characterized by having varying mass concentrations in selected widths by the step of extruding polystyrene through an annular die orifice, said orifice having at least two adjacent sections around its periphery of varying gap size; subsequently subjecting the formed polystyrene sheet of varying thickness to thermoforming individual articles, said articles being characterized by having at least two sections, one of said sections being drawn to a greater extent than said other section, said article section being drawn to the relatively greater extent being formed from the thicker portion, having higher mass concentration, of said polystyrene foam sheet material.

3,978,183

## METHOD OF FILTER MOLDING AND ELECTRICAL HEATING UNIT MADE THEREBY

Ronald E. Erickson, Oconomowoc, Wis., assignor to Sybron Corporation, Rochester, N.Y.

Filed June 24, 1974, Ser. No. 482,011
Int. Cl.² B28B 1/26
U.S. Cl. 264—87 5 Claims

1. A method of filter molding an electrical heating unit having an electrical heating element embedded wholly within and at a controlled depth from the surface of an insulating body comprising the steps of:

a. dispersing an inorganic refractory fiber and a colloidal silica binder in a liquid to form dilute suspension;

b. positioning a sheet of ceramic fiber paper upon and in contact with a filter mold screen, the thickness of said sheet corresponding to the depth below the surface of said body said heating element is to be located;

c. positioning said electrical heating element on said sheet;

d. creating a pressure differential across said filter mold screen to drain said liquid suspension through said sheet and screen, said refractory fiber being filtered from said liquid suspension and deposited on said sheet and about said heating element;

e. continuing step (d) to accumulate a layer of said refractory fiber on said sheet and about said heating element of sufficient depth to completely embedded said heating element therein;

f. removing said sheet, heating element and layer of refractory fiber as a unit from said filter mold screen; and

g. drying said unit during which period the colloidal silica in said layer migrates to the interface between said sheet and layer of refractory fiber and bonds said sheet to said layer.

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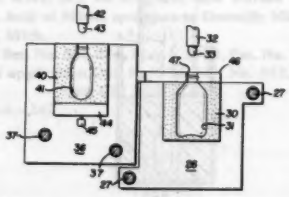
3,978,184

## METHOD OF TWO-STEP BLOW MOLDING EMPLOYING A TRANSFER CLAMP

Ambrose B. Dybala; Thomas J. Krall, and Albert R. Uhlig, all of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed July 22, 1974, Ser. No. 490,713
Int. Cl.² B29C 17/07
U.S. Cl. 264—89 10 Claims



1. In a blow molding process wherein a pre-form blow mold shuttles linearly between a first station and a second station, the pre-form blow mold being closed during its movement to the second station and opened during return movement to the first, and a final blow mold is fixed at a final blowing station, the steps of blowing a parison in said pre-form blow mold, opening said pre-form mold at said second station to expose a blown parison, retaining the exposed blown parison at the second station as the open pre-form blow mold moves back to the first station, the pre-form blow mold movement aligning a transfer clamp with a finished portion of the retained parison, substantially simultaneously closing the pre-form blow mold on a subsequently formed parison and clamping said parison finished portion in said transfer clamp, simultaneously transferring the pre-form blow mold with the subsequent parison therein to said second station and transferring the previously blown and clamped parison to said final blowing station, and blowing the non-clamped and non-finished portion only of the previously blown parison in said final blow mold at the final blowing station.

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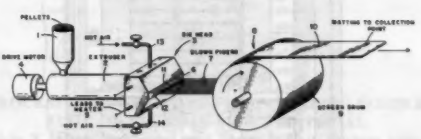
3,978,185

## MELT BLOWING PROCESS

Robert R. Buntin; James P. Keller, and John W. Harding, all of Baytown, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 227,769, Feb. 22, 1972, Pat. No. 3,849,241, which is a continuation-in-part of Ser. No. 865,105, Oct. 9, 1969, Pat. No. 3,755,527, and Ser. No. 103,050, Dec. 31, 1970, and Ser. No. 103,094, Dec. 31, 1970, which is a continuation-in-part of Ser. No. 786,122, Dec. 23, 1968, abandoned. This application May 8, 1974, Ser. No. 468,114
The portion of the term of this patent subsequent to Aug. 28, 1990, has been disclaimed.
Int. Cl.² B29C 17/06
U.S. Cl. 264—93 10 Claims



1. In a process for producing a melt-blown non-woven mat wherein a fiber-forming thermoplastic polymer resin is extruded in molten form from orifices of a heated nozzle into a stream of hot inert gas which attenuates said molten resin into fibers that form a fiber stream, and said fibers are collected on a receiver in the path of said fiber stream to form said non-woven mat,

the improvement which comprises:

extruding from said nozzle orifices a fiber-forming thermoplastic material degraded to have an intrinsic viscosity of from about 0.6 to less than 1.4 and an apparent viscosity in said nozzle orifices of from about 50 to about 300 poise.

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3,978,186

## METHOD FOR MAKING A PARTITIONED CONTAINER

Walter R. Lovejoy, Elmhurst, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

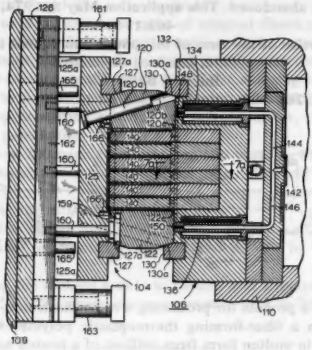
Continuation of Ser. No. 526,977, Nov. 25, 1974, abandoned, which is a continuation of Ser. No. 219,637, Jan. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 883,010, Dec. 8, 1969, which is a continuation-in-part of Ser. No. 821,238, May 2, 1969, Pat. No. 3,568,973. This application Nov. 19, 1975, Ser. No. 633,496
Int. Cl.² B29F 1/14
U.S. Cl. 264—102 15 Claims

1. A method of manufacturing a container of a rectangular, box-like configuration having a closed bottom wall and an open top and further having a plurality of partition walls extending between spaced container side walls and dividing said container into a plurality of adjacent cells with the width of each cell being substantially greater than the thickness of each partition wall and with the height of each cell between the closed bottom wall and open top being substantially greater than the width of said cell, said method comprising the steps of:

defining between a pair of separable mold members a mold cavity corresponding in configuration to said container, a first of said mold members comprising four side wall elements cooperatively defining in a first position a hollow rectangular cavity corresponding to the exterior dimensions of said container but movable to a second position in which said side wall members are displaced

laterally outward of said first position for releasing a molded container, and the second of said mold members including a plurality of laterally spaced cantilevered core members having their respective fixed end portions secured to said second mold member and their free end portions removably positionable in said rectangular cavity to define in conjunction therewith said mold cavity, each of said core members being of a height substantially greater than its thickness and a thickness substantially greater than the lateral spacing between said core members;

injecting thermoplastic material into said first mold member through a primary inlet sprue;



communicating said thermoplastic material from said primary inlet sprue through a plurality of cold runner channel means formed between contiguous ones of said four side wall elements to a plane adjacent the fixed ends of said cantilevered core elements; and

introducing thermoplastic material into said mold cavity through a plurality of inlet gates coupled to said cold runner means and disposed at spaced intervals about the periphery of said mold cavity at approximately the parting line of said pair of separable mold members adjacent to the fixed ends of said cantilevered core members.

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**3,978,187**

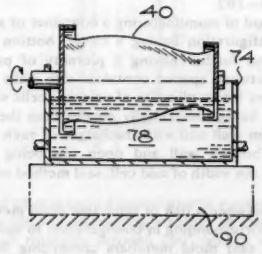
## METHOD OF MAKING HOLLOW ELASTOMERIC BODIES

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Howard F. Broyles, La Crescenta; Jovan Moacanin, Los Angeles, and Edward F. Cuddihy, Tujunga, all of Calif.**

**Filed Mar. 28, 1975, Ser. No. 563,050**

**Int. Cl.² B29C** *13/00, 25/00;* **B29D** *23/00;* **B29H** *3/04*

**U.S. Cl. 264—129** **7 Claims**



1. A method of fabricating a smooth, hollow pinhole free elastomeric body with an integral flange attached to each end thereof, each said flange having a cylindrical peripheral surface, comprising the steps of:

a. attaching a flange forming end cap to each end of a mandrel having an exterior male form corresponding to an internal surface of said hollow body, each cap having an interior surface portion surrounded by a peripheral flange edge member, disposing said edge members toward said mandrel, each cap having a diameter larger than said end and defining a flange forming cavity, at least one of said caps being releasably attached to the mandrel;

b. independently heating the mandrel;

c. disposing the mandrel horizontally and dipping 10–70% of the heated mandrel surface into a solution of elastomeric resin;

d. recirculating the elastomer solution through a heat exchanger to control the temperature thereof;

e. rotating the mandrel while in the solution an integral number of revolutions, to apply a layer of elastomeric resin to said male form and against inner surfaces of said edge members;

f. removing the mandrel from the solution;

g. drying the coated layer;

h. repeating steps (b) to (g) until the desired thickness is achieved;

i. removing the releasably attached end cap from one end of said mandrel and

j. removing the hollow elastomeric body from the mandrel over said one end.

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**3,978,188**

## METHOD OF ATTACHING TENSION RODS TO CABLES AND TENSION ROD CABLE ASSEMBLIES MADE THEREBY

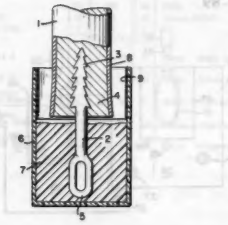
**Karl-Heinz Schoenebeck, Stadthagen, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Germany**

**Filed Aug. 22, 1975, Ser. No. 606,862**

**Claims priority, application Germany, Sept. 17, 1974, 2444324; Mar. 7, 1975, 2509980**

**Int. Cl.² B29D** *3/02*

**U.S. Cl. 264—139** **8 Claims**



1. Method of attaching a tension rod to an end of a cable, comprising the steps of:

inserting one end of a tension rod axially into the core of the cable;

vertically positioning the combination so formed with the other end of the tension rod extending downward;

moving a heat shrinkable plastic cap having one open end up from below the tension rod until the upper-side surfaces of the cap encompass a portion of the cable jacket, the plastic cap containing a reservoir of casting resin;

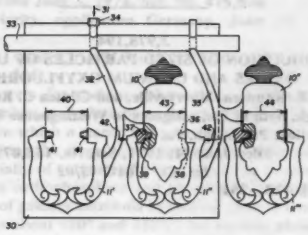
heating the upper portion of the plastic cap so as to shrink the upper side portions thereof into engagement with the cable jacket to bond the plastic cap to the cable jacket; and

further heating the lower portion of the plastic cap so as to shrink the chamber volume within the plastic cap for pressing the casting resin into the cable core.

## 3,978,189
## METHOD OF MAKING ARTICLE HAVING RELATIVELY MOVING MEMBERS

**Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.**

**Filed Nov. 18, 1974, Ser. No. 524,555**
**Int. Cl.² B29C *5/00*; B29D *9/00*; B29F *1/00*; B32B *3/00***
**U.S. Cl. 264—229** **7 Claims**

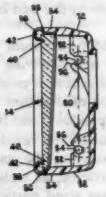


1. In a method for forming an article having two relatively movable members, a first of said members having two bearing portions and an apertured portion between said bearing portions, the bearing portions being aligned and oppositely directed, and the second of said members having two aligned bearing structures positioned to cooperate with said bearing portions, the method including forming said first member, inserting said bearing portions of said first member in a mold cavity, casting material in said mold cavity to thereby form said second member, and removing said first and second members together from said mold cavity; the improvement comprising applying mechanical stress to said first member within its elastic limit in directions toward the portions of said mold cavity within which said bearing structures are cast, then casting said material in said mold cavity to form said second member, and then releasing said mechanical stress after said material has set to thereby provide clearance between said first and second members.

## 3,978,190
## EDGE FORMING METHOD FOR MIRROR CASE

**Arthur W. Kurz, Jr., Birmingham, and Harold R. Wilson, Holland, both of Mich., assignors to Donnelly Mirrors, Inc., Holland, Mich.**

**Division of Ser. No. 356,074, May 1, 1973, Pat. No. 3,918,779.**
**This application Oct. 7, 1974, Ser. No. 512,258**
**Int. Cl.² B29C *17/02***
**U.S. Cl. 264—242** **12 Claims**



1. A method for forming a mirror assembly for vehicles comprising the steps of:

providing a molded, thermoplastic case and a mirror element having a generally planar front surface to be received therein; said case having a back and an integral, extending, thin, continuous peripheral side ending in a free edge and generally paralleling the contour of the peripheral edge of said mirror element and means for supporting said mirror element within said case a distance spaced from said back;

loading said mirror element into said case into engagement with said means for supporting said mirror element;

heating said extending edge of said case with a first means;

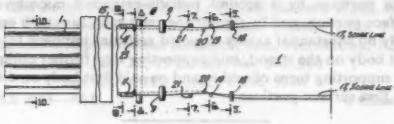
curling said heated edge over the periphery of said mirror element into contact with said element with a second means while both (a) leaving an arcuate edge overlapping the entire periphery of said mirror with an internal peripheral space between said peripheral side of said case and the entirety of the thickness of the peripheral edge of said mirror element, said peripheral space also communicating with an integral space interior of and between said arcuate edge and said mirror element, and (b) forming a contact area between said free edge of said peripheral side and said front surface of said mirror element inwardly of said peripheral edge of said mirror element which holds said mirror element against said means for supporting said mirror element and prevents vibration of said mirror element within said case and yet allows said mirror element to expand and contract beneath said contacting free edge to and from said peripheral space;

cooling said arcuate edge to retain said edge in contact with said mirror element.

## 3,978,191
## PROCESS AND APPARATUS FOR PREPARING DOUBLE EDGE ON FLEXIBLE SHEET MATERIAL

**Alvin E. Allen, Baltimore, and Merle I. Hall, Owings Mills, both of Md., assignors to Baltimore Aircoil Company, Inc., Jessup, Md.**

**Filed Mar. 11, 1974, Ser. No. 448,793**
**Int. Cl.² B29C *15/00***
**U.S. Cl. 264—285** **2 Claims**



1. A process for forming a folded edge on at least one side of a flexible sheet, which sheet is impregnated with a thermo setting resin, formed into a desired shape by forming means and cured in an oven which comprises

a. creasing said sheet the desired fold distance from an edge;

b. passing said sheet through a series of at least three pins on each side of said sheet, the first pin being at an acute angle with the sheet such that an extension of the pin is toward the center of the sheet, the second pin being essentially perpendicular to the sheet and the third pin being at an obtuse angle with the sheet such that an extension of the pin is away from the center of the sheet to force the sheet to fold under at the crease;

c. squeezing said sheet at the fold by means of an impression roll at a folded edge to hold the underfold in position;

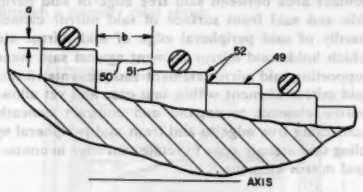
d. deflecting said sheet slightly by means of an idler roll to further reinforce the folding action; and

e. guiding said sheet into forming means by guides on each side of the sheet to retain the edge fold.

## 3,978,192
## METHOD OF DRAWING FIBERS USING A MICROTERRACED DRAWING SURFACE

Martin V. Sussman, 1361 Massachusetts Avenue, Lexington, Mass. 02173

Continuation-in-part of Ser. No. 183,066, Sept. 23, 1971, abandoned, which is a continuation-in-part of Ser. No. 20,190, March 17, 1970, abandoned. This application July 1, 1974, Ser. No. 484,994
Int. Cl.² B29C *17/02*
U.S. Cl. 264—290 N 8 Claims




1. In the process of drawing an extruded synthetic resin strand by passing the strand with plural turns between first and second spaced-apart bodies, each of which is elongated about an axis that extends transversely to the turns of the strand thereon and is canted relative to the axis of the other body, and at least the first said body having a rotating outer surface the radius of which changes along the axis thereof so as to be tapered and which engages the strand with frictional contact, the improvement comprising effecting said drawing gradually and at a controlled rate in incremented steps by supporting said strand on said tapered outer surface on discrete first microterrace surface portions, each of which extends circumferentially around the first body and axially thereof and faces radially outward thereon for subjecting the strand thereon to a surface reaction force directed substantially perpendicular to the body axis, and each of which is spaced from adjacent such portions by a second radially-extended microterrace surface portion, and by supporting each such turn with essentially no substantial axially-directed restraint imposed by said first body on the strand, said supporting step further comprising supporting turns of said strand on said first body on different first surface portions.

## 3,978,193
## METHOD AND APPARATUS FOR TREATING EXHAUST GASES

Robert J. Fedor, Westlake; Chin-Ho Lee, Lyndhurst, and M. Paul Makowski, Wickliffe, all of Ohio, assignors to Gould Inc., Rolling Meadows, Ill.

Filed Jan. 29, 1974, Ser. No. 437,674
Int. Cl.² B01D *53/00*
U.S. Cl. 423—213.7 23 Claims

1. A method of treating exhaust gases emanating from an internal combustion engine which exhaust gases include carbon monoxide, hydrocarbons, nitrogen oxides and less then about 1 volume percent unreacted oxygen comprising:

a. removing unreacted oxygen from said exhaust gases without forming significant quantities of ammonia in said gases by contacting the exhaust gases containing less than about 1 volume percent unreacted oxygen with an oxidation catalyst at a temperature sufficient to cause said unreacted oxygen to react with oxidizable material in said exhaust gases;

b. catalytically reducing nitrogen oxides in said exhaust gas from which oxygen has been removed by contacting the exhaust gas from step (a) with a nitrogen oxide reduction catalyst at a temperature at which the nitrogen oxide gases in said exhaust gas are catalytically reduced, said reduction catalyst comprising an alloy of nickel and copper wherein the weight ratio of nickel to copper is greater than 9 to 1; and

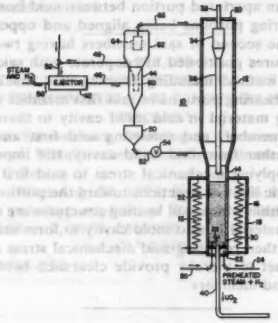
c. catalytically oxidizing the carbon monoxide and gaseous hydrocarbons present in said exhaust gases from step (b).

13. The method of claim 1 wherein said oxidizable material in said exhaust gas is selected from the group consisting of carbon monoxide, hydrocarbons, hydrogen and mixtures thereof.

## 3,978,194
## PRODUCTION OF SIZED PARTICLES OF URANIUM OXIDES AND URANIUM OXYFLUORIDES

Irving E. Knudsen, Murrysville, and Clinton C. Randall, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 21, 1971, Ser. No. 155,079
Int. Cl.² C01G *43/02*
U.S. Cl. 423—261 9 Claims




1. In a process for converting uranium hexafluoride to produce a supply of uranium dioxide and $UO_2F_2$ seed particles of a selected size for use as the bed in a fluidized bed reactor, the steps comprising

a. preliminarily reacting uranium hexafluoride with steam and hydrogen in a reaction zone to form gaseous reaction products and solid reaction products to produce varying sized seed particles of uranium oxides and oxyfluorides, the solid reaction products and the reacting gases concurrently flowing through the reaction zone,

b. continuously separating the gaseous reaction products from the seed particles, as well as the smaller particles from selected larger sized particles,

c. recycling the smaller seed particles by flowing them through the reaction zone with added subsequent mixtures of steam, hydrogen and uranium hexafluoride to grow the smaller particles into larger seed particles,

d. introducing the separated larger seed particles into a fluidized bed reactor, whereby they provide an initial fluidized bed of nuclei on which continued formation of solid uranium oxide compounds occurs, and

e. once a fluidized bed has been provided, terminating the preliminary reacting of $UF_6$, steam and hydrogen in step (a).

3,978,195

## PROCESS FOR THE PRODUCTION OF SUBSTANTIALLY WATER-INSOLUBLE LINEAR AMMONIUM POLYPHOSPHATES

Hermann Schrödter, Erftstadt Bliesheim; Hans-Werner Stephan, Cologne-Klettenberg, and Gero Heymer, Erftstadt Liblar, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 3, 1974, Ser. No. 475,820

Claims priority, application Germany, June 14, 1973, 2330174

Int. Cl.² C01B *15/16, 25/26*

U.S. Cl. 423—305 1 Claim

1. The process for making substantially water-insoluble linear ammonium polyphosphates of the general formula $(NH_4PO_3)n$, in which $n$ stands for a number between 10 and 1000, comprising the steps of reacting starting material consisting essentially of substantially equimolecular proportions of ammonium orthophosphate and phosphorus pentoxide in the presence of gaseous ammonia by heating them to temperatures between about 180° and 350°C, the starting phosphate material being of a fist size which forms a resulting hard and lumpy reaction mixture, mixing, kneading and comminuting the starting material at suitable relatively low speeds for the period necessary for the hard and lumpy reaction mixture to pass via a state of pasty consistency to a state of fine-particulate material and mixing, kneading and comminuting the fine-particulate material at a suitable relatively higher speed than applied to the hard and lumpy mixture, with the resultant formation of a quasi fluidized ammonium polyphosphate material having a relatively low water solubility of from about 2 % to about 22 % with the water insolubility increasing with increase in reaction temperature, the relatively lower speeds ranging from about 15 to 21 rpm, and the relatively higher speeds ranging from about 49 to 64 rpm.

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3,978,196

## PHOSPHORIC ACID PURIFICATION

Itaru Toshimitsu; Sakumi Fujii, and Taketoshi Nakajima, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo, Japan

Filed May 7, 1974, Ser. No. 467,782

Claims priority, application Japan, May 10, 1973, 48-51194

Int. Cl.² C01B *25/16*

U.S. Cl. 423—321 S 12 Claims

1. A process for purification of crude phosphoric acid prepared by the wet process produced by the decomposition of calcined phosphate rock with sulfuric acid or by the decomposition of uncalcined phosphate rock with sulfuric acid and deoxidizing and decolorizing the product wherein the crude wet process phosphoric acid contains pentavalent vanadium compounds, which comprises extracting said crude phosphoric acid with a $C_5$–$C_8$ aliphatic alcohol by first counter-currently contacting said crude phosphoric acid with said aliphatic alcohol and second washing the extracted solution of phosphoric acid obtained in the first step with aqueous phosphoric acid, with the proviso that at least one agent for the reduction of pentavalent vanadium is added to one of said process steps after formation of said crude phosphoric acid.

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3,978,197

## WOOD FLY ASH REDUCTION METHOD

Erwin C. Betz, 524 Mill Valley Road, Palatine, Ill. 60067

Filed Aug. 25, 1975, Ser. No. 607,469

Int. Cl.² C01B *33/32*

U.S. Cl. 423—332 9 Claims

1. A method for reducing the potassium oxide content of the wood fly ash contained in the combustion products generated by the burning of wood particles, which comprises:

mixing with the wood particles, an alkali metal silicate having a melting point below 1200° C, a secondary alkali metal compound having a melting point below 1200° C, and silica;

burning the mixture; and

withdrawing a stable potassium oxide containing silicate product having a melting point below 1200° C from the combustion products as a molten slag;

wherein the alkali metal silicate, the secondary alkali metal compound, and the silica are present in amounts effective to form the stable silica product in the presence of wood particles containing potassium oxide;

wherein the secondary alkali compound has a melting point not greater than the melting point of the stable silicate product; and

wherein the mixture is kept deficient in alkali metal silicate in order to withdraw the potassium oxide from the wood fly ash.

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3,978,198

## METHOD FOR PRODUCING CARBON DISULFIDE

Bernard Buathier; André Combes, both of Lyon, and Jean-Paul Jourdan, Ville D'Avray, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Apr. 8, 1975, Ser. No. 566,677

Claims priority, application France, Apr. 17, 1974, 74.13973

Int. Cl.² C01B *31/26*

U.S. Cl. 423—443 12 Claims

1. The process of producing carbon disulfide, comprising the step of reacting sulfur, at elevated temperatures, with a reactant consisting essentially of one or more sulfur-containing organic compounds of the general formula $R—S_n—R'$; wherein $n$ is 1 or 2, R is a lower alkyl group having 1 to 4 carbon atoms and R′ is selected from the group consisting essentially of hydrogen and lower alkyl groups having 1 to 4 carbon atoms.

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3,978,199

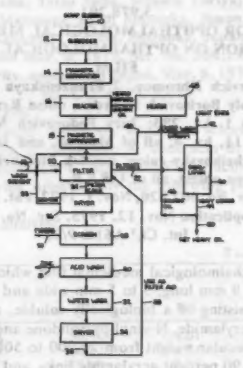
## RECOVERING CARBON BLACK FROM WASTE RUBBER

Peter Maruhnic, Pennington, N.J.; Ronald Howard Wolk, San Jose, Calif., and Carmine A. Battista, Fairless Hills, Pa., assignors to Hydrocarbon Research, Inc., Morristown, N.J.

Filed Jan. 30, 1975, Ser. No. 545,500

Int. Cl.² C01B *31/02*; C09C *1/48*

U.S. Cl. 423—461 6 Claims



1. A process for recovering carbon black from scrap vulcanized rubber, comprising the steps of:

a. dissolving rubber pieces in an aromatic solvent oil under inert conditions in a stirred reactor at about 25–100 psig

pressure and about 500°–700°F for a time sufficient to dissolve substantially all the rubber and to form a liquid-solid slurry mixture;

b. removing metallic and other foreign particles from the liquid-solid slurry mixture and passing the resultant liquid-solid slurry through a filter for separating the resultant remaining solids portion containing carbon black from the liquid-solid slurry mixture;

c. distilling the resultant filtrate to recover a light solvent and returning at least a portion thereof to the filter of step (b) along with the liquid-solid slurry mixture of step (a) and passing at least a portion of recovered heavy aromatic solvent oil resulting from said distillation to the stirred reactor of step (a);

d. drying and screening the separated carbon black of step (b) to remove any remaining fibers and foreign particles;

e. removing zinc and ash compounds from the carbon black of step (d) by washing the carbon black with an acid adapted to remove zinc and ash compounds;

f. washing the resulting carbon black of step (e) with water to remove any acid remaining after step (e); and

g. drying the resultant carbon black.

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**3,978,200**

## PROCESS FOR REDUCTION OF SULFUR DIOXIDE TO SULFUR

**Laimonis Bajars, Princeton, N.J., assignor to Catalysis Research Corporation, Palisades Park, N.J.**

**Division of Ser. No. 339,252, March 8, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 554,354**

**Int. Cl.² C01B *17/04***

**U.S. Cl. 423—570** **4 Claims**

1. The process for reducing gaseous sulfur oxides to elemental sulfur by contacting a gaseous sulfur oxide with carbon monoxide in the presence of a catalyst which comprises contacting at temperatures from about 400°C. to 700°C., at least one gaseous sulfur oxide with a catalyst comprising at least one element from the group consisting of the lanthanide periodic group, at least one element selected from the group consisting of the periodic groups IVB and VB and oxygen.

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**3,978,201**

## BASE FOR OPHTHALMOLOGICAL MEDICINAL PREPARATION ON OPTHALMOLOGICAL MEDICINAL FILM

**Gennady Lvovich Khromov, 2 Frunzenskaya ulitsa, 10, kv. 100; Anatoly Borisovich Davydov, ulitsa Krasny Kazanets, 19, korpus 1, kv. 283; Jury Fedorovich Maichuk, ulitsa Usievicha, 11, kv. 4, all of Moscow, and Inna Fedorovna Tishina, Schelkovsky raion, poselok Biofabriki, 25, kv. 22, Moskovskaya oblast, all of U.S.S.R.**

**Division of Ser. No. 302,820, Nov. 1, 1972, Pat. No. 3,935,303. This application Nov. 12, 1975, Ser. No. 631,394**

**Int. Cl.² A61K *9/22***

**U.S. Cl. 424—7** **4 Claims**

1. An ophthalmological medicinal film which is an oblong plate — 6 to 9 mm long, 3 to 5 mm wide and 0.2 to 0.6 mm thick — consisting of a biologically soluble, assimilable copolymer of acrylamide, N-vinyl-pyrrolidone and ethyl acrylate having a molecular weight from 20,000 to 500,000 and containing 10 to 90 percent acrylamide links, and an ophthalmological medicinal agent selected from the group consisting of 3-ethyl-4(1-methyl-5-imidazolyl)-tetrahydrofuran-2-one, atropine, 3-methoxy-6-sulfanilamido-pyridazine, β-dimethylaminoethyl-p-butylaminobenzoate, neamine and 5-iodo-2-desoxyuridine, said film characterized by prolonged medicinal action in the eye.

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**3,978,202**

## o-CHLOROBENZAMIDOXIME AS AN ANTI-INFLAMMATORY AGENT

**Ferenc M. Pallos, Walnut Creek, and Jack R. DeBaun, Sunnyvale, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.**

**Filed July 25, 1975, Ser. No. 599,305**

**Int. Cl.² A61K *31/15***

**U.S. Cl. 424—327** **1 Claim**

1. A method of treatment of an inflammatory condition in a mammal comprising administering to said mammal a therapeutically effective amount of o-chlorobenzamidoxime.

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**3,978,203**

## SUSTAINED RELEASE OF PHARMACEUTICALS FROM POLYESTER MATRICES

**Donald L. Wise, Belmont, Mass., assignor to Dynatech Corporation, Burlington, Mass.**

**Filed July 12, 1974, Ser. No. 487,886**

**Int. Cl.² A61K *9/22, 31/74***

**U.S. Cl. 424—22** **8 Claims**

1. A shaped implantable solid article, formed of a composition comprising a pharmaceutical agent, in a matrix, said pharmaceutical agent being adapted for controlled diffusion from said matrix upon implantation, said matrix being formed essentially of a polyester, having an average molecular weight of up to 200,000 formed by the polymerization of a first reactant which is monoacetin, triacetin, glycerol, mannitol, or sorbitol with (2) at least one of a second reactant which is fumaric acid, L-malic acid, citric acid cis-aconitic acid, isocitric acid, alpha-ketoglutaric acid, succinic acid, oxaloacetic acid, or the anhydrides, acid chlorides or disodium salts of said acids.

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**3,978,204**

## COSMETIC COMPOSITION CONTAINING MICROENCAPSULATED SOLVENTS FOR NAIL ENAMEL

**Roger Charlé, Soisy-sous-Montmorency; Charles Zviak, Franconville, and Gregoire Kalopissis, Paris, all of France, assignors to L'Oreal, Paris, France**

**Division of Ser. No. 247,583, April 26, 1972, abandoned, which is a division of Ser. No. 8,719, Feb. 4, 1970, Pat. No. 3,691,270. This application Dec. 12, 1974, Ser. No. 532,293**

**Claims priority, application Luxemburg, Feb. 4, 1969, 57905**

**Int. Cl.² A61K *9/70;* A45D *40/26;* B08B *1/00***

**U.S. Cl. 424—28** **5 Claims**

1. A process for the preparation of a cosmetic blotting paper toweling composition consisting essentially of a flexible solid blotting paper toweling support having a multiplicity of microcapsules, encapsulating said cosmetic, homogeneously distributed therein, said flexible solid blotting paper toweling support being adapted when cut to towels to be applied topically to the skin and said microcapsules having average dimensions of 50 to 100 microns and being rupturable by mechanical pressure to release said cosmetic, the walls of said microcapsules being inert to said cosmetic, the steps comprising dispersing said microcapsules in a liquid blotting paper paste phase which on solidification by draining and drying yields said flexible blotting paper toweling support, said microcapsules being dispersed therein at a time when said liquid blotting paper paste phase has a density close to that of said microcapsules so that said microcapsules are homogeneously distributed therein and solidifying by draining and drying said liquid blotting paper paste phase having said microcapsules homogeneously distributed therein to produce said cosmetic composition.

3,978,205

## DENTIFRICE INCLUDING LUSTER IMPARTING AGENT

Peter John Newman, Maidenhead, and Charles Andrew Watson, Ruislip, both of England, assignors to Lever Brothers Company, New York, N.Y.

Filed Mar. 29, 1974, Ser. No. 456,331

Claims priority, application United Kingdom, Apr. 11, 1973, 17291/73

Int. Cl.² A61K 7/16

U.S. Cl. 424—49 2 Claims

1. A toothpaste composition comprising in said toothpaste, by weight, from 5 to about 60 percent of an abrasive cleaning agent having an average particle size of about 5 to about 25 microns, and 0.1 to about 40 percent of a finely divided lustre agent, said lustre agent consisting of substantially dehydroxylated fumed silica, having been vapourized and recondensed in the form of spherical particles of a size of from about 10 to about 100 millimicrons.

3,978,206

## DENTAL COMPOSITIONS AND APPLIANCES CONTAINING ANTI-CARIOUS ION EXCHANGE RESINS

Günther Naumann, Leverkusen; Gustav Pieper, Cologne-Stammheim, and Hans-Joachim Rehberg, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 9, 1971, Ser. No. 170,319

Claims priority, application Germany, Nov. 6, 1968, 1807299

Int. Cl.² A61K 7/18

U.S. Cl. 424—49 7 Claims

1. In a dental composition a minor amount effective to inhibit caries of an ion exchange resin containing, as part of the exchangeable ions thereof, an anti-carious agent selected from the group consisting of fluoride, phosphate and calcium ions.

3,978,207

## PRESSED POWDER COSMETIC COMPOSITION

Eustace Fotiu, Mahwah; Monroe Lanzet, Pine Brook, both of N.J., and Julio Russ, East Meadow, N.Y., assignors to Revlon, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 317,177, Dec. 21, 1972, abandoned. This application Mar. 21, 1975, Ser. No. 560,642

Int. Cl.² A61K 7/021, 7/031, 7/032

U.S. Cl. 424—63 8 Claims

1. A pressed powder cosmetic composition containing from about 30 to 90% by weight of a nacreous material selected from the group consisting of mica and a coated mica, said coated mica being selected from the group consisting of titanated mica and mica coated with bismuth oxychloride, comprising from about 3 to 9 parts by weight of said nacreous material and from about 1 to 5 parts by weight of a liquid binder selected from the group consisting of a liquid lanolin absorption base and an oil solution of a wax or a lanolin alcohol, wherein the oil is a mineral oil, a liquid long chain alcohol, a liquid ester of a long chain fatty acid, or a liquid ester of a long chain alcohol.

3,978,208

## DEODORIZING COMPOSITIONS

Masao Okada, Honjo, Japan, assignor to Eisai Co., Ltd., Tokyo, Japan

Filed Jan. 7, 1974, Ser. No. 431,482

Int. Cl.² A61L 13/00

U.S. Cl. 424—76 8 Claims

5. An aqueous deodorizing composition consisting of

| | |
|---|---|
| acetohydroxamic acid | 5.0 g. |
| caprylohydroxamic acid | 2.5 g. |
| sodium lauryl sulfate | 6.0 g. |
| perfume | 2.0 g. |
| water sufficient to make up total | 100.0 ml. |

3,978,209

## ENDOTOXIN FREE MENINGOCOCCUS POLYSACCHARIDES

Guadalupe A. Limjuco, Scotch Plains, and Dennis J. Carlo, South Amboy, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 24, 1975, Ser. No. 560,767

Int. Cl.² A61K 39/02

U.S. Cl. 424—92 9 Claims

1. A method for removing endotoxin contaminants from meningococcus group A or group C polysaccharides containing endotoxin contaminant which comprises adsorbing the polysaccharide containing endotoxin contaminant on an adsorbent selected from hydroxylapatite, calcium phosphate or apatite and selectively desorbing the polysaccharide from the adsorbent while retaining the endotoxin contaminant on the absorbent by contacting the adsorbent with a phosphate buffer having a pH of about 7.0 and a molarity below about 0.4.

3,978,210

## ANTIBIOTIC ACULEACINS

Kimio Mizuno; Tetsuo Matsuda; Katsumi Asano; Akira Yagi; Masaki Takada; Tetsu Saito; Minoru Toriya; Shuzo Satoi, and Kazuo Matsuura, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

Filed Mar. 6, 1975, Ser. No. 556,190

Claims priority, application Japan, Mar. 6, 1974, 49-26598

Int. Cl.² A61K 35/70

U.S. Cl. 424—118 8 Claims

1. An antifungal antibiotic aculeacin selected from the group consisting of aculeacin-A, aculeacin-B, aculeacin-C, aculeacin-D, aculeacin-E, aculeacin-F and aculeacin-G, said aculeacins having substantially the following physico-chemical properties:

Elementary analysis:

| | C% | H% | N% |
|---|---|---|---|
| Aculeacin-A | 56.38 | 8.01 | 9.29 |
| Aculeacin-B | 60.52 | 8.54 | 9.46 |
| Aculeacin-C | 59.04 | 8.27 | 9.66 |
| Aculeacin-D | 57.95 | 8.02 | 8.83 |
| Aculeacin-E | 57.46 | 8.01 | 9.11 |
| Aculeacin-F | 54.81 | 7.59 | 9.04 |
| Aculeacin-G | 56.08 | 7.73 | 8.68 |

Molecular weight:

| | Rast Method | Amino acid analysis: * |
|---|---|---|
| Aculeacin-A | 1021 | (869) n |
| Aculeacin-B | 1145 – 1206 | (540) n |
| Aculeacin-C | 1133 – 1199 | (540) n |
| Aculeacin-D | 1209 – 1284 | (555) n |
| Aculeacin-E | 1195 – 1270 | (650) n |
| Aculeacin-F | 1227 – 1287 | (565) n |
| Aculeacin-G | 1255 – 1330 | (710) n |

*Calculated from detected amount of threonine

Molecular formula:

| | |
|---|---|
| Aculeacin-B: | $C_{50-51}H_{86-104}N_8O_{13-16}$ |
| Aculeacin-C: | $C_{50-50}H_{86-100}N_8O_{16-17}$ |
| Aculeacin-D: | $C_{50-52}H_{88-106}N_8O_{15-20}$ |
| Aculeacin-E: | $C_{52-53}H_{94-106}N_8O_{15-20}$ |
| Aculeacin-F: | $C_{50-52}H_{88-96}N_8O_{22-23}$ |
| Aculeacin-G: | $C_{52-53}H_{94-106}N_8O_{22-23}$ |

Melting point:

| | |
|---|---|
| Aculeacin-A: | 164 – 167°C. (fuse) |
| Aculeacin-B: | 148 – 151°C. (fuse) |
| Aculeacin-C: | 164 – 168°C. (fuse) |
| Aculeacin-D: | 159 – 162°C. (fuse) |
| Aculeacin-E: | 186 – 191°C. (fuse) |
| Aculeacin-F: | 163 – 167°C. (fuse) |
| Aculeacin-G: | 166 – 170°C. (fuse) |

Specific Rotation: $[\alpha]_D^{24}$ (C=1.0 methanol)

| | |
|---|---|
| Aculeacin-A*: | −53° |
| Aculeacin-B: | −45° |
| Aculeacin-C: | −47.5° |
| Aculeacin-D: | −46° |
| Aculeacin-E: | 66° |
| Aculeacin-F: | −55° |
| Aculeacin-G: | −52° |

*Result of $[\alpha]_D^{22}$ (C=0.53 methanol)

Infrared absorption spectrum (KBr tablet):

| | |
|---|---|
| Aculeacin-A: | shown in FIG. 5 in the accompanying drawing |
| Aculeacin-B: | shown in FIG. 18 in the accompanying drawing |
| Aculeacin-C: | shown in FIG. 19 in the accompanying drawing |
| Aculeacin-D: | shown in FIG. 20 in the accompanying drawing |
| Aculeacin-E: | shown in FIG. 21 in the accompanying drawing |
| Aculeacin-F: | shown in FIG. 22 in the accompanying drawing |
| Aculeacin-G: | shown in FIG. 23 in the accompanying drawing |

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**3,978,211**

## LIPIARMYCIN AND ITS PREPARATION

**Carolina Coronelli; Francesco Parenti, both of Milan; Richard White, Como, and Hermes Pagani, Milan, all of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy**

**Filed Oct. 31, 1974, Ser. No. 519,472**

**Claims priority, application United Kingdom Jan. 22, 1973, 54170-73**

**Int. Cl.² A61K *35/74***

**U.S. Cl. 424—120** **3 Claims**

1. An antibiotic named lipiarmycin having the following characteristics:

a. Melting point: 173°–175°C.

b. Molecular weight (potentiometric determination): 1076

c. Elemental analysis: C: 58.02%; H: 6.94%; Cl: 6.64%; O: 28.40% (by difference);

d. Characteristic U.V. absorption bands in the following solvent systems:

| Solvent | max(m μ) | $E_{1\ cm.}^{1\%}$ |
|---|---|---|
| methanol | 232 | 354 |
| | 268 (shoulder) | 214 |
| | 315 | 108 |
| phosphate buffer pH 7.38 | 238 | 331 |
| | 275 | 194 |
| hydrochloric acid 0.1 N | 231 | 338 |
| | 272 | 207 |
| sodium hydroxide 0.1 N | 235 | 370 |
| | 270 (shoulder) | 183 |

e. Characteristic infrared absorption bands in Nujol at the following frequencies (cm. $^{-1}$): 3600, 3450, 2900(Nujol), 1730, 1690, 1640, 1585, 1560, 1460(Nujol), 1380(Nujol). 1300, 1240, 1200, 1140, 1120, 1075, 1025, 990, 950, 915, 900, 890, 850, 820, 790, 780, 745, 720, 705

f. Specific rotation $[\alpha]_D^{20}$ (1.98% methanol)=−5.5°

g. Solubility:

Very soluble in methanol, ethanol, phyridine, aqueous sodium carbonate;

Fairly soluble in benzene, methylene chloride, chloroform, acetone, propanol;

Sparingly soluble to insoluble in water, buffered solution at pH 7, aqueous sodium bicarbonate, hexane

h. Characteristic reactions:

Tollens: positive

$FeCl_3$: positive

$H_2SO_4$: positive

Schiff: negative

Millon: negative

Maltole: negative

i. pKa in methylcellosolve:6.8

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**3,978,212**

## ELECTROLYTE SOLUTIONS CONTAINING MAGNESIUM AND FREE BICARBONATE IONS

**Bohdan Barna, Pickering, Canada, assignor to Chemo Drug Company, Weston, Canada**

**Filed Dec. 13, 1974, Ser. No. 532,542**

**Claims priority, application Canada, Dec. 19, 1973, 188504**

**Int. Cl.² A61K *33/06, 33/10***

**U.S. Cl. 424—156** **18 Claims**

1. In the method for preparing a clear, aqueous electrolyte solution comprising bicarbonate anion and magnesium cation at ambient temperatures, the improvement which comprises:

providing carbon dioxide gas dissolved in the solution as carbonic acid in amounts up to about the saturation point of the solution and sufficient to prevent the formation and precipitation of water insoluble magnesium compounds, and thereafter terminally sterilizing said solution by heating in a sealed container at elevated temperatures.

12. An article of manufacture, in a sealed container, which comprises:

a. magnesium cation and bicarbonate anion dissolved in a clear aqueous electrolyte solution; and

b. between 0.05 and 1.8 milliequivalents of carbon dioxide dissolved in the solution, up to the saturation point thereof, as carbonic acid at ambient temperatures and pressures per milliequivalent of bicarbonate anion, the solution being terminally sterilizable in said sealed container to produce a clear solution without precipitated water insoluble magnesium compounds.

3,978,213

## COSMETIC USE OF CYCLIC AMP AND PHOSPHODIESTERASE INHIBITORS

Eugene Lapinet, Paris, France; Georges D. Cehovic, Santa Ana, Calif., and Theodore Z. Posternak, Geneva, Switzerland, assignors to Nelson Research & Development Company, Irvine, Calif.

Continuation-in-part of Ser. No. 270,070, July 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 111,623, Feb. 1, 1971, abandoned. This application Jan. 3, 1975, Ser. No. 538,395

Int. Cl.² A61K *7/00, 31/52, 31/705*

U.S. Cl. 424—180 2 Claims

1. A method of temporarily softening and enhancing the natural elasticity of the skin comprising applying topically to human skin a composition comprising from about 0.01 to about 2% by weight of a member selected from the group consisting of cyclic 3',5'-adenosine monophosphate and a cosmetically acceptable salt thereof, about 0.1 to about 2% by weight of a non-toxic inhibitor of phosphodiesterase and a suitable dermatological carrier.

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3,978,214

## NOVEL 4,6-DI-O-(AMINOGLYCOSYL)-2-DEOXYSTREPTAMINE, METHOD FOR ITS MANUFACTURE, METHOD FOR ITS USE AS AN ANTIPROTOZOAL AGENT AND COMPOSITIONS USEFUL THEREOF

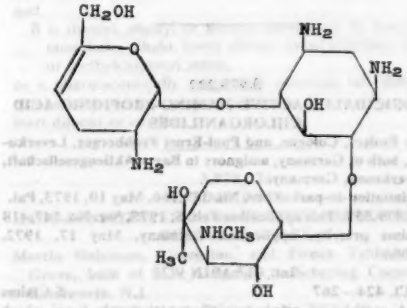
Alan K. Mallams, West Orange, N.J., and David Huw Davies, Macclesfield, England, assignors to Schering Corporation, Kenilworth, N.J.

Filed May 2, 1975, Ser. No. 574,074

Int. Cl.² A61K *31/71*; C07H *15/22*

U.S. Cl. 424—180 4 Claims

1. A compound selected from the group consisting of O-2-amino-2,3,4-trideoxy-α-D-glycero-hex-4-enopyranosyl-(1→4)-garamine as defined by the following structural formula:



and the pharmaceutically acceptable acid addition salts thereof.

3,978,215

## LOCAL ANAESTHETIC

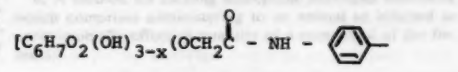
Yan Shuster, ulitsa Kveles 15, korpus 4, kv. 30, Riga; Valdis Danielovich Mikazhan, Stopinsky selsovet Tuber kuleznaya bolnitsa, Rizhsky raion; Milda Yanovna Pormale, ulitsa Suvorova, 104, kv. 10, Riga; Nadezhada Alexandrovna Kashkina, ulitsa Talsu, 9/11, kv. 22, Riga, and Arvid Yanovich Kalninsh, ulitsa Sverdlova, 8, kv. 3, Riga, all of U.S.S.R.

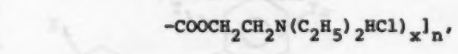
Continuation of Ser. No. 453,668, March 20, 1974, abandoned. This application Jan. 6, 1975, Ser. No. 538,851

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 6 Claims

1. A local anaesthetic, comprising an anaesthetically effective amount of an active ingredient consisting of a polymeric derivative of the hydrochloride of the 2-diethylaminoethyl ester of p-aminobenzoic acid of the following general formula:





where *x* is the degree of substitution and may range from 0.60 to 1.00 and *n* is the degree of polymerization and may range from 40 to 120 combined with a pharmaceutical carrier selected from the group consisting of isotonic solution, distilled water and an ointment base.

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3,978,216

## METHOD FOR TREATING SCHIZOPHRENIA AND METHOD AND COMPOSITION FOR POTENTIATING NEUROLEPTIC DRUGS

Kjell Fuxe, Sollentuna, Sweden, assignor to Nelson Research & Development Company, Irvine, Calif.

Continuation-in-part of Ser. No. 475,856, June 3, 1974, Pat. No. 3,947,579. This application July 16, 1975, Ser. No. 596,571

Int. Cl.² A61K *31/54, 31/195*

U.S. Cl. 424—247 2 Claims

1. A method for potentiating the neuroleptic activity of phenothiazine derivatives having neuroleptic activity comprising administering to a schizophrenic about 5 to about 50 percent of a conventional dosage amount of a phenothiazine derivative having neuroleptic activity and an amount equal to about 0.1 to about 100 mg/kg of aminooxyacetic acid or a pharmaceutically acceptable salt thereof.

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3,978,217

## WATER-SOLUBLE 1 AND/OR 2 ACID ALKYLENE IMIDAZOLES

Sándor Szilke, Budapest; György Lugosi, Felsogod; Gyorgy Csermely; Mária Bakonyi, both of Budapest; Tibor Zsolnai, and István Szepessy, both of Debrecen, all of Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

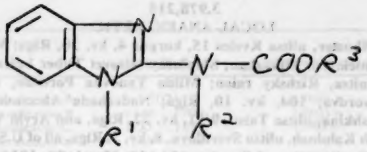
Filed Jan. 30, 1975, Ser. No. 545,745

Claims priority, application Hungary, Feb. 5, 1974, CI 1440

Int. Cl.² C07D *235/32*

U.S. Cl. 424—245 6 Claims

1. A compound of the formula:



wherein $R^1$ and $R^2$ each is hydrogen or $-(CH_2)_n-SO_3H$ with at least one of $R_1$ and $R_2$ being $-(CH_2)_n-SO_3H$;

*n* is an integer between 1 and 5; and

$R^3$ is alkyl,

or a fungicidally acceptable salt thereof.

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**3,978,218**

## METHODS OF TREATING A MAMMAL AFFLICTED WITH CONVULSIONS, WITH DIALKYLAMINOALKYL ETHERS OF 2-ALKOXY-3,5-DIHALOBENZENE AND SALTS THEREOF

**Michel Léon Thominet, Paris, France, assignor to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France, Paris, France**

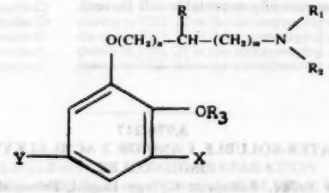
**Division of Ser. No. 369,567, June 13, 1973, Pat. No. 3,904,622, which is a continuation-in-part of Ser. No. 80,211, Oct. 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 798,164, Feb. 10, 1969, abandoned. This application May 13, 1975, Ser. No. 577,098**

**Claims priority, application France, Feb. 16, 1968, 68.140294; May 10, 1968, 68.151632**

**Int. Cl.² A61K** *31/135, 31/535*

**U.S. Cl. 424—248** **7 Claims**

1. The method of treating a mammal afflicted with convulsions which comprises administering to said mammal a therapeutically effective amount of a dialkylaminoalkyl ether of 2-alkoxy-3,5-dihalobenzene, a non-toxic acid addition salt thereof or a quaternary ammonium salt thereof, said dialkylaminoalkyl ether of 2-alkoxy-3,5-dihalobenzene having the formula:



in which *m* is an integer from 0 through 2; and *n* is an integer from 0 through 2; R is hydrogen or lower alkyl of less than 6 carbon atoms; $R_3$ is lower alkyl of less than 6 carbon atoms; $R_1$ and $R_2$ are hydrogen, lower alkyl of less than 6 carbon atoms or form, together with the nitrogen atoms, morpholino; and X and Y are the same halogens.

**3,978,219**

## NICOTINAMIDOXIME AS AN ANTI-INFLAMMATORY AGENT

**Ferenc M. Pallos, Walnut Creek, and Jack R. DeBaun, Sunnyvale, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.**

**Filed July 25, 1975, Ser. No. 599,274**

**Int. Cl.² A61K** *31/455, 31/465*

**U.S. Cl. 424—264** **1 Claim**

1. A method of treatment of an inflammatory condition in a mammal comprising administering to said mammal a therapeutically effective amount of nicotinamidoxime.

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**3,978,220**

## NOVEL PHENOLATE, A PROCESS FOR ITS PREPARATION AND ITS USE IN PHARMACEUTICAL COMPOSITIONS

**Gerd Badicke, Opladen; Hans-Dieter Dell, Bergisch-Gladbach, and Albrecht Pitzken, Bensberg-Herkenrath, all of Germany, assignors to Troponwerke Dinklage & Company, Cologne, Germany**

**Filed Apr. 1, 1975, Ser. No. 564,189**

**Claims priority, application Germany, Apr. 3, 1974, 2416253**

**Int. Cl.² A61K** *31/445*

**U.S. Cl. 424—267** **15 Claims**

1. [4-(diphenylmethoxy)-1-methylpiperidinium]-4-[1-hydroxy-2-(1-methyl-3-phenylpropylamino) propyl]phenolate.

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**3,978,221**

## METHODS FOR IMPROVING THE FEED INTAKE OF MEAT PRODUCING ANIMALS

**Clifton A. Baile, Glen Mills; William D. Kingsbury, West Chester, and Roger C. Parish, King of Prussia, all of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.**

**Filed Mar. 4, 1975, Ser. No. 555,337**

**Int. Cl.² A61K** *31/445, 31/40*

**U.S. Cl. 424—267** **8 Claims**

1. The method of inducing feeding in pigs, sheep and cattle comprising administering to said animals internally by feed composition or injection an effective feeding inducing but nontoxic quantity of tropine benzohydryl ether, 3-quinuclidinyl benzohydryl ether or their nontoxic acid addition salts.

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**3,978,222**

## FUNGICIDALLY ACTIVE 3-AMINO-PROPIONIC ACID CHLOROANILIDES

**Edgar Enders, Cologne, and Paul-Ernst Frohberger, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

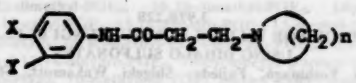
**Continuation-in-part of Ser. No. 359,166, May 10, 1973, Pat. No. 3,879,539. This application Feb. 5, 1975, Ser. No. 547,418**

**Claims priority, application Germany, May 17, 1972, 2224006**

**Int. Cl.² A01N** *9/22*

**U.S. Cl. 424—267** **5 Claims**

1. A method of combating phytopathogenic fungi which comprises applying to said pest or its habitat a phytopathogenic fungicidally effective amount of a 3-aminopropionic acid anilide of the formula



in which

X and Y are each halogen, methyl or trifluoromethyl, provided that at least one of them is halogen, and

*n* is 4 or 5,

or an acid-addition salt thereof.

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## 3,978,223

## UREIDOACETAMIDO-PENICILLINS FOR TREATING BACTERIAL INFECTIONS

**Hans-Bodo König; Wilfried Schröck, both of Wuppertal-Elberfeld; Hans Disselnkötter, Cologne, and Karl Georg Metzer, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

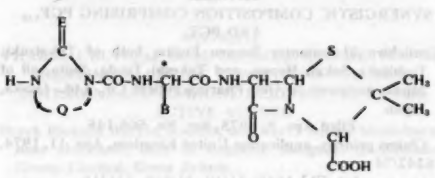
**Division of Ser. No. 426,187, Dec. 19, 1973, which is a division of Ser. Nos. 145,809, May 21, 1971, abandoned, and Ser. No. 145,877, May 21, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,419**

**Claims priority, application Germany, May 25, 1970, 2025414; May 25, 1970, 2025415**

**Int. Cl.[2] A61K *31/43***

**U.S. Cl. 424—271** **42 Claims**

1. A pharmaceutical composition for treating bacterial infections comprising an antibacterially effective amount of a penicillin of the formula:

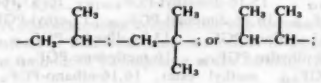


wherein

the carbon atom designated by * constitutes a center of chirality;

E is oxygen or sulphur;

Q is $-CH_2)_2$;



and

B is thienyl, phenyl or phenyl substituted by lower alkyl, monohalo, dihalo, lower alkoxy, lower alkylthio, hydroxy or methylcarbonylamino,

or a pharmaceutically acceptable nontoxic salt thereof, in combination with a pharmaceutically acceptable nontoxic, inert diluent or carrier.

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## 3,978,224

## ANTIMICROBIAL HALO-SUBSTITUTED-2-CYANOETHYLAMINOALKYL-3-PHENYL-INDOLES

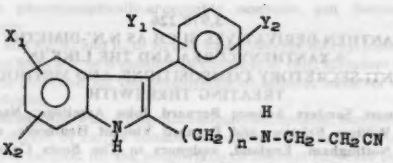
**Martin Steinman, Livingston, and Pirouz Tahbaz, Cedar Grove, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.**

**Filed July 1, 1975, Ser. No. 592,158**

**Int. Cl.[2] C07D *209/14*; A61K *31/40***

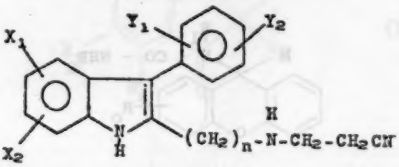
**U.S. Cl. 424—274** **9 Claims**

1. A compound of the formula:



wherein $X_1$, $X_2$, $Y_1$ and $Y_2$ are hydrogen or halogen and at least one of $X_1$ and $X_2$ is halogen; n is an integer selected from 1, 2 and 3; and the acid addition salts thereof.

6. A method for treating susceptible microbial infections, which comprises administering to an animal so infected an antimicrobially effective quantity of a compound of the formula:



wherein $X_1$, $X_2$, $Y_1$ and $Y_2$ are hydrogen or halogen and at least one of $X_1$ and $X_2$ is halogen; and n is an integer selected from 1, 2 and 3; and the acid addition salts thereof.

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## 3,978,225

## HETEROCYCLIC HOMOPROSTANOIDAL DERIVATIVES

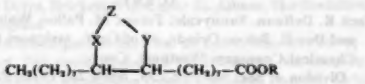
**Allan D. Bender, Swarthmore; Charles E. Berkoff, Huntingdon Valley, and William G. Groves, Blue Bell, all of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.**

**Filed May 13, 1975, Ser. No. 577,136**

**Int. Cl.[2] C07D *317/26*, *327/10*, *339/06*, *341/00***

**U.S. Cl. 424—276** **5 Claims**

1. A pharmaceutical composition in dosage unit form which inhibits prostaglandin synthesis and antagonizes diarrhea induced by prostaglandin $E_2$ comprising a chemical compound of the formula:



in which:

X and Y being the same are oxygen or sulfur;

Z is sulfoxide or methylene when X and Y are oxygen and thioxo when X and Y are sulfur; and

R is hydrogen when Z is methylene or thioxo and lower alkyl when Z is sulfoxide and a pharmaceutical carrier.

## 3,978,226

## XANTHEN DERIVATIVES SUCH AS N,N'-DIMETHYL-N-9-XANTHENYLUREA AND THE LIKE IN ANTI-SECRETORY COMPOSITIONS, AND METHOD OF TREATING THEREWITH

**Stuart Sanders Adams; Bernard John Armitage; Norman William Bristow, and Bernard Vincent Heathcote, all of Nottingham, England, assignors to The Boots Company Limited, Nottingham, England**

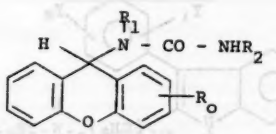
**Division of Ser. No. 408,378, Oct. 23, 1973, Pat. No. 3,927,029, which is a continuation of Ser. No. 191,112, Oct. 20, 1971, abandoned, which is a continuation-in-part of Ser. No. 662,587, Aug. 23, 1967, Pat. No. 3,644,420. This application Feb. 13, 1975, Ser. No. 549,535**

**Claims priority, application United Kingdom, Sept. 2, 1966, 39384/66; Apr. 5, 1967, 15692/67**

**Int. Cl.² A61K *31/35***

**U.S. Cl. 424—283** **12 Claims**

1. A therapeutic composition having anti-secretory use which comprises as an active ingredient an effective anti-secretory amount of a compound of the Formula



I

in which

$R_o$ is selected from the group consisting of hydrogen, halogen, alkyl and alkoxy;

$R_1$ is alkyl; and

$R_2$ is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkanoyloxyalkyl, alkoxyalkyl and alkanoyl; and

wherein the terms "alkyl", "alkoxy", "alkanoyloxy" and "alkanoyl" indicate such groups containing up to 7 carbon atoms, in association with pharmaceutical excipients known for the production of compositions suitable for oral, rectal or parenteral administration.

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## 3,978,227

## 5-FUROYL-2,2,4-TRIMETHYL-1,4-DIHYDRO-1H-1,5-BENZODIAZEPINE AS AN ANTI-INFLAMMATORY AGENT

**Jack R. DeBaun, Sunnyvale; Ferenc M. Pallos, Walnut Creek, and Don R. Baker, Orinda, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.**

**Division of Ser. No. 572,233, April 28, 1975, Pat. No. 3,947,475. This application Aug. 22, 1975, Ser. No. 606,998**

**Int. Cl.² A61K *31/34***

**U.S. Cl. 424—285** **1 Claim**

1. A method of treatment of an inflammatory condition in a mammal comprising administering to said mammal an anti-inflammatory effective amount of 5-furoyl-2,2,4-trimethyl-1,4-dihydro-1H-1,5-benzodiazepine.

## 3,978,228

## METHOD FOR KILLING NOXIOUS FUNGI IN PLANTS USING DIHALO SULFONATES

**Eiichi Yoshinaga, Fujieda; Shigeki Wakamori, Shimizu; Gosaburo Dowke, Tokyo, and Kiyoshi Takita, Shimizu, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan**

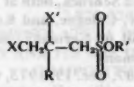
**Continuation of Ser. No. 312,323, Dec. 5, 1972, abandoned. This application Mar. 24, 1975, Ser. No. 561,365**

**Claims priority, application Japan, Dec. 13, 1971, 46-100843**

**Int. Cl.² A01N *9/14***

**U.S. Cl. 424—303** **2 Claims**

1. A method for killing noxious fungi on plants, comprising applying to noxious fungi on plants a fungicidally effective amount of a sulfonate having the formula



wherein X and X' are selected from the group consisting of bromine and chlorine, R is selected from the group consisting of hydrogen and methyl, and R' is selected from the group consisting of methyl, propyl, octyl, trichloroethyl, dibromopropyl, phenyl, monochlorophenyl, dichlorophenyl, monobromophenyl, nitro-phenyl, methyl-phenyl, butyl-phenyl and methoxy-phenyl.

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## 3,978,229

## SYNERGISTIC COMPOSITION COMPRISING $PGF_{2\alpha}$ AND $PGE_2$

**Kimiichiro Matsumoto; Tsuneo Fujita, both of Takatsuki; Toshitaka Sakai, Hyogo, and Takeshi Tsuda, Suita, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Apr. 8, 1975, Ser. No. 566,146**

**Claims priority, application United Kingdom, Apr. 11, 1974, 16242/74**

**Int. Cl.² A61K *31/19, 31/215, 31/715***

**U.S. Cl. 424—317** **9 Claims**

1. A synergistic composition comprising as active ingredients a $PGF_{2\alpha}$ compound which is a member selected from the group consisting of $PGF_{2\alpha}$, ω-hexahomo-$PGF_{2\alpha}$, 15(S)-methyl-$PGF_{2\alpha}$, 16(R)-methyl-$PGF_{2\alpha}$, 17(S)-methyl-$PGF_{2\alpha}$, 17(R)-methyl-$PGF_{2\alpha}$, 18-methyl-$PGF_{2\alpha}$, 19-methyl-$PGF_{2\alpha}$, 15,16-dimethyl-$PGF_{2\alpha}$, 15(S),16(R)-dimethyl-$PGF_{2\alpha}$, 16,16-dimethyl-$PGF_{2\alpha}$, 17-ethyl-$PGF_{2\alpha}$, 16-cyclohexyl-ω-trinor-$PGF_{2\alpha}$, 13,14-dihydro-$PGF_{2\alpha}$, 15-methyl-13,14-dihydro-$PGF_{2\alpha}$, 16-methylene-$PGF_{2\alpha}$, 16-methylene-$PGF_{2\alpha}$ methyl ester, 16,16-ethano-$PGF_{2\alpha}$, trans-$\Delta^{16}$-$PGF_{2\alpha}$ methyl ester, 16,17-methano-$PGF_{2\alpha}$, 15-methyl-16-phenylthio-ω-tetranor-$PGF_{2\alpha}$, 16-(3-trifluoromethylphenoxy)-9α,11α,15α-trihydroxy-ω-tetranorprosta-cis-5,trans-13-dienaldehyde, 9α,11α,15α-trihydroxy-16-phenylthio-ω-tetranorprosta-cis-5,trans-13-dienaldehyde, 9α,11α,15α-trihydroxy-16-phenoxy-ω-tetranorprosta-cis-5,trans-13-dienaldehyde, 9α,11α,15α-trihydroxy-16-(3-trifluoromethylphenoxy)-ω-tetranorprost-cis-5-enaldehyde, 15-(2-benzo[b]thienyl)-ω-pentanor-$PGF_{2\alpha}$ methyl ester, 15-(2-benzofuranyl)-ω-pentanor-$PGF_{2\alpha}$ methyl ester, 9α,11α,15α-trihydroxy-15-(2-benzofuranyl)-ω-pentanorprosta-cis-5,trans-13-dienaldehyde, 9α,11α,15α-trihydroxy-15-(2-benzo[b]-thienyl)-ω-pentanorprosta-cis-5,trans-13-dienaldehyde, 15-(2-benzofuranyl)-ω-pentanor-$PGF_{2\alpha}$ alcohol, 16-(cyclohex-1-enylthio)-ω-tetranor-$PGF_{2\alpha}$ methyl ester, 16-(3-trifluoromethylphenoxy)-ω-tetranor-$PGF_{2\alpha}$, 16-phenoxy-ω-tetranor-$PGF_{2\alpha}$ and 17-phenyl-ω-trinor-16,16,17,17-tetradehydro-$PGF_{2\alpha}$ -methyl ester, or its cyclodextrin clathrate thereof and a $PGE_2$ compound which is a member selected from the group consisting of $PGE_2$, ω-hexahomo-$PGE_2$, 16(R)-methyl-$PGE_2$, 17(R)-methyl-$PGE_2$, 18-methyl-$PGE_2$,

3,16(R)-dimethyl-PGE$_2$, 16,16-dimethyl-PGE$_2$, 16-ethyl-PGE$_2$, 17-ethyl-PGE$_2$, 13,14-dihydro-PGE$_2$, 15-methyl-13,14-dihydro-PGE$_2$, 16(R)-methyl-13,14-dihydro-PGE$_2$, 15,16(R)-dimethyl-13,14-dihydro-PGE$_2$, 16-cyclohexyl-ω-trinor-13,14-dihydro-PGE$_2$, 16-methylene-PGE$_2$ methyl ester, trans-$\Delta^{16}$-PGE$_2$ methyl ester, 16(R)-methyl-13,14-dihydro-PGE$_2$ methyl ester, 16,16-ethano-PGE$_2$ methyl ester, 16(ξ)-methyl-20-hydroxy-PGE$_2$, 16,16-propano-ω-nor-PGE$_2$, 16,16-propano-ω-dihomo-PGE$_2$ and 16,16-propano-ω-nor-PGE$_2$ methyl ester, or its cyclodextrin clathrate thereof, at a weight ratio of from about 1:0.001 to about 1:2000.

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## 3,978,230
## ARTHROPOD MATURATION INHIBITORS

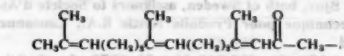
**Meyer Schwarz, Kensington; Philip E. Sonnet, Bowie, and Nobel Wakabayashi, New Carrollton, all of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 436,239, Jan. 24, 1974, Pat. No. 3,904,773, which is a division of Ser. No. 104,781, Jan. 7, 1971, Pat. No. 3,824,319. This application Mar. 24, 1975, Ser. No. 561,585**

**Int. Cl.$^2$ A01N 9/24**

**U.S. Cl. 424—331** **2 Claims**

1. A method of preventing the maturation of Tenebrio molitor pupae comprising applying to the pupae a maturation inhibiting amount of a compound of the formula



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## 3,978,231
## PHARMACEUTICAL COMPOSITIONS AND METHOD OF TREATING ALLERGIC CONDITIONS UTILIZING 2-NITROINDANE-1,3-DIONE DERIVATIVES AS THE ACTIVE AGENTS

**Derek Richard Buckle, Redhill, and Harry Smith, Maplehurst, near Horsham, both of England, assignors to Beecham Group Limited, Great Britain**

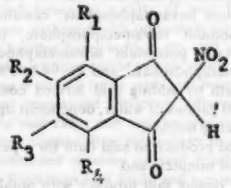
**Division of Ser. No. 421,239, Dec. 3, 1973, Pat. No. 3,925,557, which is a division of Ser. No. 317,296, Dec. 21, 1972, Pat. No. 3,936,504. This application Mar. 10, 1975, Ser. No. 556,861**

**Claims priority, application United Kingdom, Jan. 25, 1972, 3348/72; Mar. 22, 1972, 13300/72; June 20, 1972, 28707/72; Oct. 18, 1972, 48027/72**

**Int. Cl.$^2$ A61K 31/12**

**U.S. Cl. 424—331** **22 Claims**

1. A pharmaceutical composition in a form suitable for oral, parenteral or insufflation administration to humans comprising an amount of a compound of the formula (I)



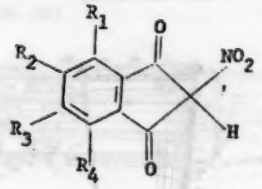
(I)

or a pharmaceutically-acceptable nontoxic salt thereof, wherein

$R_1$ and $R_2$, $R_2$ and $R_3$ or $R_3$ and $R_4$ are alkyl or alkenyl joined to form a 5- or 6-membered carbocyclic ring, sufficient to be effective for the prophylaxis of asthma, hayfever or rhinitis,

in combination with a pharmaceutically-acceptable, nontoxic, inert diluent or carrier suitable for said administration form.

12. A method for the prophylaxis of asthma, hayfever and rhinitis in humans which comprises administering to a human in need thereof orally, parenterally or by insufflation an amount of a compound of the formula (I)



(I)

or a pharmaceutically-acceptable, nontoxic salt thereof, wherein

$R_1$ and $R_2$, $R_2$ and $R_3$ or $R_3$ and $R_4$ are alkyl or alkenyl joined to form a 5- or 6-membered carbocyclic ring, sufficient to be effective for the prophylaxis of asthma, hayfever or rhinitis,

in combination with a pharmaceutically-acceptable, nontoxic, inert diluent or carrier suitable for said administration form.

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## 3,978,232
## THIN WALLED CONTAINERS FOR PRESSURIZED LIQUIDS

**Edward Dodsworth, 6 Willow Close, Gomersal, Yorkshire; Thomas Norman Gaunt, 179 Wetherby Road, Leeds 17, Yorkshire; Wynn Price Davies, "Dormers", 19 Holmdene Ave., Mill Hill, London N.W.7, and David Reed Wilkins, 7 Garnett Drive, Brickett Wood, near St. Albans, Hertfordshire, all of England**

**Continuation-in-part of Ser. No. 212,491, Dec. 27, 1971, abandoned. This application June 19, 1974, Ser. No. 480,916**

**Claims priority, application United Kingdom, Dec. 30, 1970, 61817/70**

**Int. Cl.$^2$ B65D 23/00, 3/00; B65B 31/02**

**U.S. Cl. 426—115** **1 Claim**

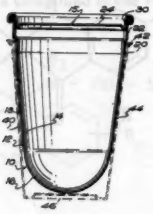
1. A package containing carbonated beverage comprising in combination:

a. an inner container

1. having a closed bottom and open top and side walls extending therebetween,
2. having thin walls,
3. composed of high impact polystyrene of Izod Impact Measurement within the range of 1.0 to 1.25 ft.-lb./in. of notch, and
4. having a wall thickness within the range of 0.013 – 0.018 inches,

b. a lid member extending across the open top of said inner container and including release means forming part of the lid member which is manually operable to release the pressure inside the container,

c. sealing means adjacent the periphery of said lid member and adjacent the periphery of the open top of said inner container for engaging said lid member in a sealing relationship across the open top of said inner container,



d. a quantity of carbonated beverage located within the inner container closed by said lid member and which maintains a pressure of at least 30 p.s.i. once said lid member has been applied across the open top of said inner container, and

e. a restraining cup disposed annularly around said inner container and engaging at least a portion of the walls of said inner container, said restraining cup

1. being composed of high impact polystyrene of Izod Impact Measurement in the range of 1.7 to 2.1 ft-lb/in. of notch, and
2. having a wall thickness which is greater than that of the inner container, whereby the increase in pressure within the container, due to the temperature of the environment, will extend the walls of the inner container outwardly into firm frictional engagement with the restraining cup such that the cup and inner container cannot be separated manually until the release means is opened and the pressure relieved.

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**3,978,233**

**LIQUID WARMER**

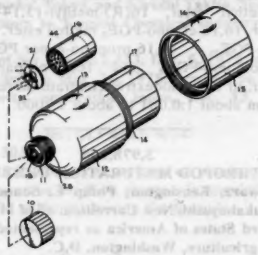
**Alex W. Bolt, 1408 Richmond Ave., No. 255, Houston, Tex. 77006**

**Filed Sept. 16, 1974, Ser. No. 506,252**

**Int. Cl.² B65D** *23/12*

**U.S. Cl. 426—115** **12 Claims**

1. A portable hot liquid system comprising a single container said container being a heat conducting material and having a necked opening at one end thereof, and an insulated cover over the surface thereof said insulated cover having a top section adjacent to said necked opening, fixedly attached to said container and having a threaded neck extending around said necked opening of said container, and a bottom cup section engaging said top section and being removably mounted on said container said container having an opening which has a removable resilient plug therein, located adjacent to the cup section of said cover said opening being within the



insulated cover when said cup section is engaged to said top section.

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**3,978,234**

**PROTEIN COMPOSITION**

**Sven Ingmar Walton Bosund, Halsingborg, and Bengt Lennart Bengtsson, Bjuv, both of Sweden, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland**

**Continuation of Ser. No. 362,343, May 21, 1973, abandoned. This application May 27, 1975, Ser. No. 580,819**

**Claims priority, application United Kingdom, May 22, 1972, 24005/72**

**Int. Cl.² A23C** *11/00, 21/00*

**U.S. Cl. 426—285** **12 Claims**

1. A skimmed milk replacement composition comprising, on a dry solids by weight basis, an admixture of 15 to 30% of a fish protein isolate with 70 to 85% of whey solids, said isolate containing at least 90% protein, less than 0.5% of lipids, of from 1 to 10% of minerals, and having a Nitrogen Solubility Index (NSI) of 80 to 100.

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**3,978,235**

**PRESERVATIVE PROCESS FOR PRODUCE USING A COMPOSITION COMPRISING SODIUM HYPOCHLORITE AND ALKALI EARTH METAL PHOSPHATES AND COMPOSITION**

**Phillip Schiro, Tampa, Fla., assignor to Joe Jess Estrada, Castroville, Calif.**

**Continuation-in-part of Ser. No. 355,939, April 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 93,843, Nov. 30, 1970, abandoned. This application May 20, 1974, Ser. No. 471,648**

**Int. Cl.² A21D** *4/00*

**U.S. Cl. 426—335** **19 Claims**

1. A process for preserving whole and sliced produce comprising:

a. forming a composition including, by weight, 5–12% sodium hypochlorite, 0.001–2% by weight a vehicle having high molecular weight selected from the group consisting of sodium hexametaphosphate, lithium hexametaphosphate, potassium hexamtaphosphate, cesium hexametaphosphate, sodium tetrametaphosphate, lithium tetrametaphosphate, potassium tetrametaphosphate, and cesium tetrametaphosphate, and 86–94.999% water;

b. forming a bath by adding said formed composition to about 1 to 200 gallons of water, dependent upon the type of produce being treated;

c. subjecting said produce to said bath for a period of time from 0.5 to 30 minutes; and

d. subsequently rinsing said produce with potable water.

## 3,978,236

## PROCESS FOR PRODUCING PUFFED PROTEINACEOUS FOOD PRODUCTS

Louis Sair, Evergreen Park, and Donald W. Quass, Downers Grove, both of Ill., assignors to The Griffith Laboratories, Inc., Chicago, Ill.

Division of Ser. No. 77,720, Oct. 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 750,025, Aug. 5, 1968, abandoned, which is a continuation-in-part of Ser. No. 349,735, March 5, 1964, Pat. No. 3,440,054. This application Apr. 30, 1975, Ser. No. 573,366

Int. Cl.² A23L *1/01, 1/20;* A23J *3/00*

U.S. Cl. 426—445 4 Claims

1. The method of preparing a textured, puffed, proteinaceous food product comprising subjecting water-moistened, hydrophilic proteinaceous material having a protein content of at least about 30% on a dry weight basis and an effective amount of water within the range of about 10 to 50% to working under effective mechanical pressure and sufficient temperature conditions of more than about 100°C. to convert it to a hot, moist, plastic extrudable mass and extruding said hot plastic mass through and from a length of an elongated die under non-puffing conditions to provide a moisture-containing, unpuffed, substantially homogeneous, translucent to glassy, extruded product, recovering said extruded product, and, as a separate and distinct operation, thereafter puffing said recovered product in a moist state by subjecting it to water-boiling puffing conditions.

## 3,978,237

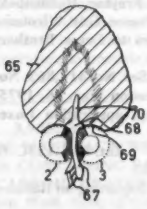
## METHOD OF HULLING BERRIES WITH OPPOSITELY ROTATING BRUSHES CONTAINING STIFF AND RESILIENT BRISTLES

Salvador A. Minera, 1921 Taraval, San Francisco, Calif. 94116

Division of Ser. No. 371,829, June 20, 1973, Pat. No. 3,869,977. This application Jan. 16, 1975, Ser. No. 541,560

Int. Cl.² A23L *1/212;* A23N *15/02*

U.S. Cl. 426—481 5 Claims




1. The method of removing the calyx from the body of a berry having a stem end and a substantially central axis extending therethrough and which calyx includes a stem enlargement on said axis within said body at said stem end and a plurality of sepals connected with said enlargement extending radially outwardly therefrom and from said axis across the outer surface of said stem end adjacent said enlargement, comprising the steps of:

a. gathering said sepals together in approximately side by side relation extending in a direction outwardly of said stem end generally axially of said body wherein said sepals are gathered with oppositely rotating brushes containing bristles being sufficiently stiff and resilient to pull the sepals without tearing them; then

b. applying a pulling force with said bristles to said calyx in said last mentioned direction adjacent the connection between said calyx and said enlargement and restraining said body against free movement in said direction and with continued rotation of said brushes advancing said pulling force into said body and across said enlargement to the side thereof opposite said calyx, and then applying said force against said opposite side in the direction of said calyx thereby converting said pulling force to a pushing force applied to said enlargement directed outwardly of said stem end axially of said body, and then

c. ejecting said enlargement and said calyx from said body under the influence of said pushing force.

## 3,978,238

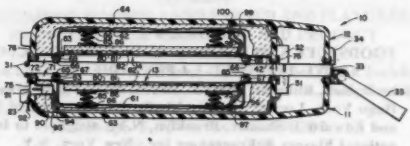
## METHODS OF WARMING FOOD BETWEEN MOVEABLE SPRING BIASED HEATER MEANS

Irwin K. Frey, P.O. Box 4836, Fairview Park, Ohio 44126, and Charles L. Zola, 24619 Royalton Road, Columbia Station, Ohio 44028

Continuation of Ser. No. 321,462, Jan. 5, 1973, abandoned, which is a division of Ser. No. 273,013, July 18, 1972, Pat. No. 3,746,837. This application July 14, 1975, Ser. No. 595,796

Int. Cl.² A23C *3/00*

U.S. Cl. 426—523 6 Claims



1. A method of warming foods through conductive heating, comprising the steps of:

a. providing a food warming appliance including:

i. a pair of connected housing portions which are relatively movable toward each other to a closed position and away from each other to an open position;

ii. a first heater means carried internally of one of said housing portions;

iii. a second heater means carried internally of the other of said housing portions;

iv. said housing portions being operable when in said closed position to define a chamber internally of said housing portions;

v. said housing portions additionally being operable when in said closed position to establish a substantially continuous engagement therebetween perimetrically of such chamber whereby such chamber is closed when said housing portions are in said closed position;

vi. said first and second heater means being positioned in such chamber and being operable when energized to achieve an operating temperature which is not substantially in excess of 200°F.;

vii. at least one of said heater means being movable relative to its carrying housing portion such that when said housing portions are in said closed position, said first and second heater means are movable relatively toward and away from each other without causing corresponding relative movement of said housing portions; and

viii. spring biasing means is operably connected to said at least one heater means and to said at least one heater means and to its carrying housing portion for biasing said at least one heater means relative to its carrying housing portion such that when said housing portions are in said closed position, said at least one heater means is biased toward the other of said heater means;

b. positioning said housing portions in said open position;

c. inserting food to be warmed between said first and second heater means;

d. closing the appliance by moving said housing portions to said closed position to close such chamber with such food positioned therein and to bring said first and second heater means into firm engagement with opposite sides of such food with said first and second heater means being biased relatively toward each other by said spring biasing means and to thereby maintain firm clamping engage-

ment between said heater means and such food so long as said housing portions are retained in said closed position; and,

e. while said housing portions are retained in said closed position, energizing said first and second heater means to heat such food as is positioned between said heater means to an operating temperature which is not substantially in excess of 200°F. and which is not substantially in excess of the desired temperature to which such food is to be warmed, such energization of said heater means being continued for a period of time sufficient to warm the food to such desired temperature.

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3,978,239

## FOODSTUFF AND FLAVORING CONTAINING $C_1$-$C_6$ ALKYL-2-METHYL-3,4-PENTADIENOATES

John B. Hall, Rumson; Denis E. Hruza, Brick Town; Manfred Hugo Vock, Locust; Joaquin Vinals, Red Bank, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,118
Int. Cl.² A23L *1/235*
U.S. Cl. 426—534 4 Claims

1. A process for altering the fruit flavor of a foodstuff which comprises adding thereto from 0.2 ppm up to about 50 ppm by weight based on the total weight of the foodstuff which is a fruit flavor augmenting amount, of a composition consisting essentially of one or more $C_1$–$C_6$ alkyl-2-methyl-3,4-pentadienoates.

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3,978,240

## FOODSTUFF CONTAINING A DIESTER OF MONOTHIOCARBONIC ACID

Arnoldus van der Heijden, and Leonard Schutte, both of Zevenaar, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 411,109, Dec. 30, 1973, abandoned, which is a division of Ser. No. 204,692, Dec. 3, 1971, Pat. No. 3,787,473. This application June 23, 1975, Ser. No. 589,481
Int. Cl.² A23L *1/226*
U.S. Cl. 426—535 9 Claims

1. An improved foodstuff that is consumed upon heating between a temperature of from 70° to 150°C, having incorporated therein an effective amount of a precursor flavoring ingredient for improving the respective flavor of said foodstuff when the foodstuff is subjected to said heating, the precursor flavoring ingredient comprising a diester of monothiocarbonic acid having the general formula:

$$R^1 - S - CO - O - R^2$$

wherein $R^1$ is a substituted or unsubsituted alkyl, homo or heterocyclic radical having up to 10 carbon atoms and not more than two hetero atoms selected from the group consisting of oxygen and sulphur, and wherein $R^2$ represents a secondary or tertiary hydrocarbyl group containing 3–20 carbon atoms, attached to the oxygen with the secondary or tertiary carbon atom.

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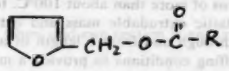
3,978,241

## FLAVORING AGENT

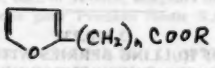
Max Winter, Geneva; Fritz Gautschi, Commugny; Ivon Flament; Max Stoll, both of Geneva, all of Switzerland, and Irving M. Goldman, Niantic, Conn., assignors to Firmenich & Cie, Geneva, Switzerland

Division of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 843,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application June 24, 1974, Ser. No. 482,687
Int. Cl.² A23L *1/234*
U.S. Cl. 426—536 56 Claims

23. As a new composition of matter a soluble coffee material having added thereto a minor, but flavormodifying amount of a compound selected from the group of compounds having the general formulae:



wherein R is a lower alkyl group having between two and six carbon atoms, or a butenyl group; and



wherein R is a lower alkyl group; and *n* is 0 or 2.

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3,978,242

## CHEESE FLAVOR

Wolfram Gustav Freytag, Halstenbek; Karl Heinz Ney, Hamburg, and I. Poetoe Gde Wirotama, Rellingen, all of Germany, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 417,863, Nov. 21, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,319
Claims priority, application Luxemburg, Nov. 22, 1972, 66516
Int. Cl.² A23C *1/226*
U.S. Cl. 426—537 7 Claims

1. Process for imparting an Italico-cheese flavour to a foodstuff in which:

a. a cheese flavouring composition is prepared by admixing of components selected from the group consisting essentially of:
   i. from 0.3 to 10 parts by weight of 2-phenyl ethanol;
   ii. from 3 to 40 parts by weight of methyl-1-butanols selected from the group consisting of 2-methyl-1-butanol,3-methyl-1 butanol and mixtures thereof;
   iii. from 0 to 600 parts by weight of alkanoic acids having 3 to 6 carbon atoms;
   iv. from 0 to 10 parts by weight of isobutanol and/or straight-chain 1-alkanols having 4 to 6 carbon atoms;
   v. from 0 to 5 parts by weight of 2-alkanols having 5 to 9 carbon atoms;
   vi. from 0 to 10 parts by weight of alkylamines, dialkylamines and trialkylamines having 1 to 2 carbon atoms in the alkyl group;
   vii. from 0 to 10 parts by weight of pyrrolidine and/or piperidine; and,
b. admixing the mixture obtained by step (a) with said foodstuff in an amount to give 0.3 to 10 mg/kg 2-phenyl ethanol and 3 to 40 mg/kg of methyl-1-butanols in the flavoured foodstuff.

3,978,243

## PROCESS FOR PREPARING GELLED SOUR MILK

Jens Kristian Pedersen, Albertslund, Denmark, assignor to Kobenhavns Pektinfabrik, Copenhagen, Denmark

Filed Jan. 30, 1975, Ser. No. 545,656

Claims priority, application United Kingdom, Feb. 5, 1974, 5335/74

Int. Cl.² A23L *1/04*

U.S. Cl. 426—573 7 Claims

1. A method of preparing a gelled sour milk product having a pH of about 3.8 to 4.6 which comprises stabilizing said sour milk with a stabilizer selected from the group consisting of high methoxyl pectin, carboxymethyl cellulose, and propylene glycol alginate, and gelling said stabilized sour milk by a gelling agent selected from the class consisting of low methoxyl pectin, carrageenan, and furcellaran and thereafter subjecting the mixture to temperature conditions sufficient to effect gelling, said stabilizer being present in amount of about 0.1 to 5% based on the weight of the sour milk, and said gelling agent being about 0.2 to 2% by weight of the entire gelled product.

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3,978,244

## PUFFED PROTEINACEOUS FOOD PRODUCTS AND METHODS OF PRODUCING SAME

Louis Sair, Evergreen Park, Ill., assignor to The Griffith Laboratories, Inc., Chicago, Ill.

Division of Ser. No. 77,720, Oct. 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 750,025, Aug. 5, 1968, abandoned, which is a continuation-in-part of Ser. No. 349,735, March 5, 1964, Pat. No. 3,440,054. This application Mar. 25, 1975, Ser. No. 561,909

Int. Cl.² A23L *1/01*, *1/10*; A23J *3/00*

U.S. Cl. 426—580 18 Claims

1. The method of preparing a puffed, proteinaceous food product comprising subjecting an unneutralized protein mix of hydrophilic protein and about 10 to 40 parts of water per 60 parts of protein, on a dry basis, to mixing and heavy mechanical compaction pressure conditions sufficient to cause said mix to undergo plastic flow and provide a moisture-containing, compressed, substantially homogeneous, translucent to glassy product under non-puffing conditions, recovering said product, and, as a separate and distinct operation, thereafter puffing said recovered product in a moist state by subjecting it to a water-boiling temperature to provide a puffed, proteinaceous food product.

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3,978,245

## PROCESS FOR THE MANUFACTURE OF A DRY FOODSTUFF POWDER CONTAINING FATS, PROTEINS AND CARBOHYDRATES

Rolf Deininger, and Erich Wolf, both of Cologne, Germany, assignors to Klosterfrau Berlin, Berlin, Germany

Filed July 23, 1974, Ser. No. 491,497

Claims priority, application Luxemburg, Oct. 22, 1973, 68658; Apr. 1, 1974, 69764

Int. Cl.² A23J *3/00*; A23D *5/00*; A23L *2/38*

U.S. Cl. 426—585 10 Claims

1. A process for the manufacture of a dry foodstuff powder having a bulk density of about 0.240 g/ml containing edible oils which are liquid at room temperature, high level of protein and low level of carbohydrates, which consists essentially of:

a. forming an aqueous, substantially fat-free dispersion containing protein, wherein said protein is selected from the group consisting of:

i. one obtained by osmosis-dialysis of at least one member selected from the group consisting of skimmed milk and whey, against water, by conducting the dialysis with a dialysis membrane which is permeable to lactose but impermeable to milk albumen and constantly preventing fluocculation of the albumen by adequately maintaining a neutral and sterile medium and maintaining the temperature at 65°C or less;

ii. one obtained from powdered soya, cereal grain or potatoes;

or

iii. one obtained by bacterially acidulating skim milk at 38° to 45°C, then centrifuging off the liquid;

which dispersion further contains carbohydrates, foodstuff supplements selected from the group consisting of vitamins, minerals and flavoring materials and in which said protein accounts for at least 60% of the non-fat solids content and said carbohydrates account for above 0% but not greater than 35% of the non-fat solids content;

b. emulsifying the dispersion of step (a) with ⅛ to 1 part edible oil per part protein, said oil containing a high proportion of essential fatty acids;

c. adjusting the emulsion of step (b) to a water content of 50 to 80% and a pH of about 6.1;

d. drying the emulsion of step (c) at a temperature not greater than 65°C, thereby forming a powder.

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3,978,246

## PROCESS OF MAKING A SWEETENED AND FLAVORED PEANUT BUTTER OR SPREAD AND PRODUCT THEREOF

Chris Chozianin, Morton Grove; Calvin R. Luce, Lake Zurich, and Harold W. Zukerman, Skokie, all of Ill., assignors to Kraftco Corporation, Glenview, Ill.

Filed Apr. 5, 1974, Ser. No. 458,233

Int. Cl.² A23L *1/38*

U.S. Cl. 426—633 8 Claims

1. A method for manufacturing a flavored peanut composition comprising the steps of preparing a peanut butter or peanut spread having a moisture of less than 1.5 percent and having a temperature above about 110°F; dispersing sugar and flavor in melted margarine type oil having an SFI value at 50°F between about 25 and 30 and at 92°F of less than about 5, the ratio of fat to sugar in said dispersion being in excess of 1.0, the sugar being primarily sucrose, the moisture being less than 1 percent, and the temperature being in excess of about 110°F; intimately mixing said peanut butter or peanut spread and said dispersion of sugar and flavor in margarine type oil at a temperature above about 110°F to provide a fat level in the mixture between about 50 percent and about 55 percent and a solids-not-fat level between about 45 percent and about 50 percent; the level of sugar in said mixture being at least about 10 percent, rapidly cooling said mixture with agitation to between about 45°F and 60°F; and immediately packaging the flavored peanut composition at a moisture of less than about 1 percent.

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3,978,247

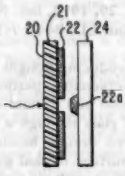
## TRANSFER RECORDING PROCESS

Robert Stewart Braudy, Cherry Hill, and Hamilton Harvey Roberts, Jr., Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 28, 1974, Ser. No. 436,930

Int. Cl.² D06P *1/00*

U.S. Cl. 427—43 4 Claims




1. In a method of recording which comprises selectively irradiating with a modulated beam of electromagnetic energy one surface of a carrier film having on its opposite surface on

energy transferable colorant coating so as to cause the transferable coating to vaporize and deposit on a surface of an adjacent, spaced recording element, the improvement which comprises employing as said colorant coating a binderless dry film consisting essentially of a dye of pigment of low thermal conductivity, low density, low specific heat, low vaporization temperature, small heat of vaporization and vaporizing over a temperature range of less than 30°C. and capable of absorbing sufficient energy from said electromagnetic energy beam to vaporize without decomposition and capable of being applied to said carrier film from solution or suspension in a solvent, said film being dry and binderless both prior to and during exposure to said selective irradiation.

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**3,978,248**

## METHOD FOR MANUFACTURING COMPOSITE SINTERED STRUCTURE

**Tamotsu Usami, Yamanashi, Japan, assignor to Hitachi, Ltd., Japan**

**Continuation-in-part of Ser. Nos. 209,093, Dec. 17, 1971, abandoned, and Ser. No. 331,035, Feb. 9, 1973, abandoned. This application Jan. 10, 1974, Ser. No. 432,428**

**Claims priority, application Japan, Dec. 18, 1970, 45-113026; Feb. 9, 1972, 47-13610**

**Int. Cl.² B05D 5/12**

**U.S. Cl. 427—96** **19 Claims**

1. A method for manufacturing a composite sintered structure comprising the steps of

a. preparing a mixture comprising an inorganic powdered ceramic material and a binder,

b. forming a green ceramic sheet from said mixture,

c. forming a green ceramic paste from said mixture,

d. forming a conductor paste from said mixture by adding a powdery material of at least one metal thereto,

wherein the ratio of the inorganic powdered ceramic material to the binder in the green ceramic sheet is equal to the ratio of the inorganic powdered ceramic material to the binder in each of said green ceramic paste and said conductor paste,

e. printing a layer of said conductor paste on selected surface areas of said green ceramic sheet,

f. locally printing a layer of said green ceramic paste on selected surface areas of said conductor paste and thereafter

g. heating the resulting assembly to form a unitary body.

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**3,978,249**

## METHOD FOR PRODUCING INTRICATE METAL DESIGNS ON GLASS

**William C. Cooke, Kingsport, Tenn., assignor to ASG Industries, Inc., Kingsport, Tenn.**

**Filed Apr. 29, 1974, Ser. No. 464,965**

**Int. Cl.² B44D 1/18**

**U.S. Cl. 427—99** **10 Claims**

1. The method of producing designs of metal on glass comprising, applying a screenable pasting agent comprising a mixture of talc or kaolin and sodium silicate in water to one surface of a sheet of glass through a screen to produce the negative of the desired design, heating said sheet of glass, metallizing said one surface of said glass sheet including the portions thereof covered with said pasting agent to form a coating of metal thereon, and brushing the one surface of said glass sheet to remove the applied pasting agent and the portion of said metal coating overlying said pasting agent to provide the positive of the desired design in metal securely bonded to said surface of said glass sheet.

10. A method of producing designs of metal on glass comprising, applying a screenable pasting agent comprising a mixture of talc or kaolin and sodium silicate in water to one surface of a sheet of glass through a screen to produce the negative of the desired design, heating said glass sheet, metallizing said one surface of said glass sheet including the portion thereof covered with said pasting agent in amounts to form a metal coating of at least 1 mil in thickness and brushing said one surface of said glass sheet to remove the applied pasting agent and the portion of said metal coating overlying said pasting agent to provide the positive of the desired design in metal securely bonded to said surface of said glass sheet.

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**3,978,250**

## PROCESS AND APPARATUS FOR FORMING A LAYER FROM A MIXTURE OF PARTICLES HAVING VARIABLE PARTICLE SIZES

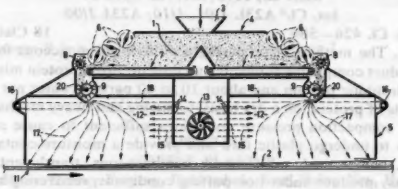
**Berndt Greten, Springe, Germany, assignor to Bison-werke Bahre & Greten GmbH & Co. KG, Springe, Germany**

**Filed May 9, 1975, Ser. No. 576,022**

**Claims priority, application Germany, May 9, 1974, 2422487**

**Int. Cl.² B05C 5/00**

**U.S. Cl. 427—201** **33 Claims**



1. A process for improving the separating or sifting effect realized during the formation of a layer made from a mixture of unsorted, glue-covered, dust-like, extremely fine, fine, medium-coarse, and coarser components, preferably of a vegetable origin such as wood chips, fibers, or the like on a conveying device, wherein the components are cast or thrown onto said conveying device by means of spaced-apart throwing rolls or the like, drivable about horizontal axes, in the moving direction of the layer or oppositely to the moving direction of the layer, the components being cast or thrown in the zone located beneath and between the throwing rolls so that the coarser components are placed in the central portion of this zone, the components forming the layer being penetrated by air currents having an air-sifting effect and substantially reversing the direction of horizontal movement of the cast components as they fall.

2. Apparatus for forming a layer from a mixture of particulate matter having variable particle sizes comprising a spreading chamber, a conveying device at least partially in said spreading chamber for supporting said layer, at least two opposed throwing members for throwing particulate matter fed thereto onto the portion of said conveying device in said spreading chamber, and means for generating air currents flowing through said spreading chamber for substantially reversing the horizontal movement of the particulate matter falling through said spreading chamber onto said conveying device.

## 3,978,251
## ALUMINIDE COATINGS

Alvin R. Stetson, San Diego, and Victor S. Moore, El Cajon, both of Calif., assignors to International Harvester Company, San Diego, Calif.

Filed June 14, 1974, Ser. No. 479,419
Int. Cl.² C23C 9/02
U.S. Cl. 427—229 24 Claims

1. A process for protecting a superalloy containing one or more elements which have an adverse effect on hot corrosion resistance thereagainst said process comprising: forming on a substrate of said superalloy a dense overlay which is rich in intermetallic compounds of aluminum and elements which are hot corrosion resistant, which is essentially free of substrate elements as aforesaid, and which is metallurgically bonded to the substrate by aluminides of substrate elements, the formation of said overlay being effected by: coating the substrate with a non-ferrous, aluminum-free modifier which contains, in particulate form:

| Element | Percent by Weight |
|---|---|
| Ni | 10–70 |
| Co | 10–70 |
| Cr | 5–20 |
| Y | 0–1 |
| Zr | 0–1 |
| Si | 0–1; |

and then aluminizing the coated substrate to produce a corrosion resistant overlay as aforesaid, said aluminizing being continued until the aluminum has penetrated through the coating and reacted with one or more substrate elements to form the metallurgical bond as aforesaid.

## 3,978,252
## METHOD OF IMPROVING THE ADHESION BETWEEN A MOLDED RESIN SUBSTRATE AND A METAL FILM DEPOSITED THEREON

Michael S. Lombardo, Waterbury; Elaine F. Jacovich, Cheshire; Eugene D. D'Ottavio, Thomaston, and John J. Grunwald, New Haven, all of Conn., assignors to MacDermid Incorporated, Waterbury, Conn.

Continuation of Ser. No. 344,279, March 23, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,539
Int. Cl.² C23C 3/02, 13/02
U.S. Cl. 427—299 11 Claims

1. The method of improving adhesion between a plastic substrate and a deposited film of metal formed in situ on the surface of the substrate by an electroless metal plating process, which comprises the steps of first forming a laminate of the plastic substrate and a sacrificial metal foil by bonding said foil to said substrate, chemically stripping said foil from the laminate thus formed, activating said substrate for electroless metal deposition, and electrolessly depositing said film of metal thereon, wherein said substrate is contacted by a dilute solution containing an organic silicon compound at some step subsequent to said chemical stripping operation but at least cotemporaneously with the electroless metal deposition step, said organic silicon compound being insufficient in amount to form an intermediate layer thereof between the substrate and said deposited film of metal, said silicon compound being a silane having the general formula:

$$R.Si(R_1)_3$$

where R is an amino substituted lower alkyl radical containing up to 6 carbons and $R_1$ is a lower alkanoxy radical containing up to 3 carbons.

## 3,978,253
## METHOD OF APPLYING A PROTECTIVE COATING TO A BODY

Peter Sahm, Nussbaumen, Switzerland, assignor to Brown, Boveri & Company Limited, Baden, Switzerland

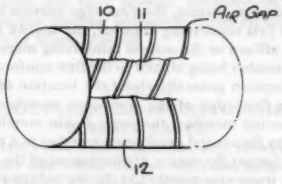
Filed Mar. 16, 1972, Ser. No. 235,244
Claims priority, application Switzerland, Mar. 22, 1971, 4179/71
Int. Cl.² C25F 3/02; C25D 3/04, 5/24
U.S. Cl. 427—309 5 Claims

1. A method of applying a protective coating to a eutectic or near eutectic alloy which contains a continuously multi-ply connected crystalline phase, and at least one other non-continuous phase, which comprises completely removing from the surface of said alloy, one or more of said non-continuous phases such that a roughened alloy surface, having the continuous phase remain and thereafter coating said roughened surface.

## 3,978,254
## CARRIER SLEEVE FOR PRINTING CYLINDER

Rolf Hoexter, Englewood, N.J., and Sidney Katz, Spring Valley, N.Y., assignors to Mosstype Corporation, Waldwick, N.J.

Filed Jan. 27, 1975, Ser. No. 544,291
Int. Cl.² B29D 23/12
U.S. Cl. 428—36 4 Claims




1. A carrier sleeve having a circular form for supporting flexible printing plates, said sleeve having a predetermined length and having limited circumferential resilience whereby the sleeve is slidable over and removable from an apertured printing cylinder adapted to emit air jets serving to dilate the sleeve; said sleeve comprising three interlaminated layers each formed by a helix of flexible tape whose convolutions are separated by an air gap, said tapes being formed of thin synthetic plastic film material which is of high strength and is chemically inert, said material having sufficient stretchability to permit limited circumferential dilation of the sleeve under air pressure, two of said helices being wound at the same angle and being displaced in phase relative to each other, whereby the gap in one helix is bridged by the convolutions of the other helix to render the sleeve impermeable to air, the remaining helix being wound at a different angle which is equal and opposite to the angle of the two helices, whereby the convolutions thereof intersect the convolutions of the underlying helix to strengthen and rigidify the sleeve, said plastic film tapes having gauges producing an overall sleeve thickness of about 0.12 to 0.14 inches, said interlamination of said tapes being

effected by an adhesive coating on the inner face of the outermost layer, whereby the innermost layer is bonded to the intermediate layer which is bonded to the outermost layer.

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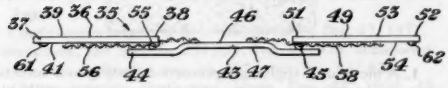
3,978,255

## FOLDABLE COMPOSITE REINFORCING MEMBER FOR USE IN A FOAM STRUCTURE

Hubert Stacy Smith, Jr., Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 24, 1974, Ser. No. 517,701
Int. Cl.² B32B *3/10*; E04C *1/00*, *2/34*
U.S. Cl. 428—47 4 Claims




1. A reinforcement member which can be folded and rolled and is particularly suited for the preparation of structures by the spiral generation technique, the reinforcement member comprises in cooperative combination,

a first skin member,

a second skin member,

a transverse member and

at least first and second foraminous sheet members, the first skin member and first sheet member being in generally overlapping face-to-face relationship, the second skin member and second reinforcing member being in generally face-to-face overlapping relationship,

the transverse member having

a first edge portion and

a second edge portion, the first edge portion being affixed to the first reinforcing member, the second edge portion being affixed to the second reinforcing member, the first skin member being affixed to the first reinforcing member at a location generally about the location of attachment of the first edge of the transverse member to the first reinforcing member, the second skin member being affixed to the second reinforcing member in a region generally adjacent the region of attachment of the second edge of the transverse member to the second reinforcing member, the first and second reinforcing member projecting beyond the adjacent portions of the first and second skin members at a location generally adjacent the location of attachment to the first skin member and first reinforcing member and second skin member and reinforcing member respectively, with the further limitation that the skin members will prevent contact of a foaming material contained thereby with application apparatus and the reinforcement can be folded and rolled.

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3,978,256

## THREE-DIMENSIONAL MONOCOQUE OPEN-ENDED ANNULAR STRUCTURE

Varnell L. James, Enumclaw, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed June 14, 1974, Ser. No. 479,397
Int. Cl.² B32B *3/02*, *5/18*; B64C *1/00*; B65H *81/00*
U.S. Cl. 428—66 25 Claims

1. A three-dimensional composite structure comprising: at least one ring shaped reinforced rib continuously wound with a composite tape, an annulus shaped open-ended member incorporating the rib and having continuously wound composite tape longitudinally encircling inside and outside surfaces of the member.

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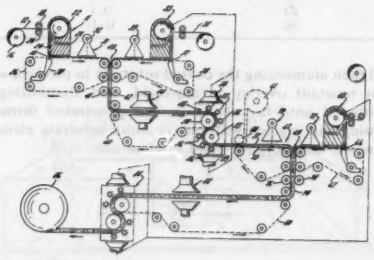
3,978,257

## INTERNALLY ADHESIVELY BONDED FIBROUS WEB

David F. Ring, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Aug. 6, 1973, Ser. No. 385,663
Int. Cl.² B32B *3/00*
U.S. Cl. 428—137 10 Claims



1. An internally adhesively bonded fibrous material having a basis weight of between about 10 to about 100 grams per meter² comprising layers of substantially non self bonded fibres, and minute, adhesive interfiber bonds distributed nonuniformly in the Z direction of the material and forming an integral, three dimensional internal fiber scrim, said interfiber bonds being distributed according to a distribution characteristic curve with peaks and a gradual tapering off away from the peaks representing high bond concentration near the planes intermediate the fiber layers and progressively lower bond concentration approaching both surfaces of the material, the surfaces of the material being essentially adhesive free and solely fibrous.

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3,978,258

## EMBOSSED DECORATIVE SHEET-TYPE MATERIAL AND PROCESS FOR MAKING SAME

Kenneth J. Faust, Orwigsburg, and Richard L. Maass, Emmaus, both of Pa., assignors to GAF Corporation, New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,536
Int. Cl.² B32B *5/20*, *31/20*
U.S. Cl. 428—159 17 Claims

1. Decorative sheet-type covering material having an embossed surface and comprising:

a. a substrate;

b. a pigmented layer;

c. a foamed plastic layer adhered to said pigmented layer and having selectively crushed transparent portions through which said pigmented layer is visible; and

d. a selectively partially crushed foamed plastic undercoat under said pigmented layer with the selectively partially

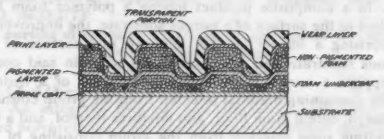
crushed portions thereof in register with the selectively crushed portions of said foamed plastic layer.

15. A process for making decorative sheet-type covering material having an embossed surface which comprises:

a. forming a foamable undercoat of wet PVC plastisol or organosol containing blowing agent on a latex coated felt substrate, said foamable undercoat being pigmented and being between about 2 and about 20 mils thick;

b. heating the undercoat formed in step (a) under temperature conditions sufficient to gel said undercoat without foaming same;

c. applying a wet, nonpigmented layer of foamable PVC plastisol or organosol over the pigmented undercoat, said nonpigmented foamable plastisol or organosol being between about 4 and about 20 mils thick;




d. heating the layer of step (c) sufficient to gel same without foaming either the layer of step (c) or the undercoat of step (a);

e. applying printing to the gelled, nonpigmented, foamable layer;

f. applying a wet wear layer of PVC plastisol or organosol to the printed and gelled, nonpigmented, foamable layer, said wear layer having a thickness between about 4 and about 20 mils;

g. heating the sheet sufficiently to cure the wear layer and cure and foam the undercoat and nonpigmented, foamable layers; and

h. selectively crushing portions of the sheet by mechanical embossing to form transparent portions of the nonpigmented, foamed layer, at least some of such transparent portions having a thickness less than the thickness of the layer of step (c) and to simultaneously partially crush portions of the nonpigmented, foamed layer.

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**3,978,259**

## PROCESS FOR INCREASING THE COEFFICIENT OF FRICTION OF TEXTILE YARN OR CLOTH

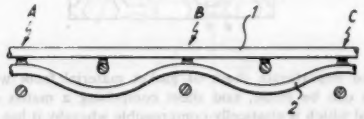
**William James Hilton, Ashby de la Zouche, England, assignor to Bonas Brothers Limited, Great Britain**

**Continuation-in-part of Ser. No. 302,246, Oct. 30, 1972, abandoned. This application Oct. 2, 1974, Ser. No. 511,369**

**Claims priority, application United Kingdom, Apr. 22, 1972, 18781/72; Dec. 4, 1971, 56408/71**

**Int. Cl.² A41F 9/00; B05C 3/20**

**U.S. Cl. 428—195** **10 Claims**




8. A textile fabric having at least a part thereof being coated with an inert, non-slump room temperature vulcanised silicone rubber, said rubber having an elongation at least three times that of said fabric.

**3,978,260**

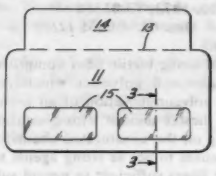
## SUBSTANTIALLY CURL-FREE SEMI-RIGID SUPPORT MEMBER FOR FOOD PACKAGES

**Thomas Edward Dobbins, Neenah; William Duane Hanson, and Ronald Eugene Wenzel, both of Appleton, all of Wis., assignors to American Can Company, Greenwich, Conn.**

**Filed July 10, 1975, Ser. No. 594,815**

**Int. Cl.² B32B 3/00**

**U.S. Cl. 428—204** **3 Claims**




1. A multi-layered, semi-rigid, substantially curl-free package component of composite structure adapted to support and retain a moist and greasy food product within a sealed transparent package, said supporting and retaining package component comprising

an inner core layer of between about 5 and about 10 mils in thickness comprising transparent, high impact polystyrene,

a coating layer of opaque printing ink covering the entire surface of each side of said core layer except for an unprinted area, the unprinted areas being substantially equal and in general registry with one another to provide an inspection window, each said surface having a substantially equal weight of said printing ink thereon,

a protective overcoating layer of a transparent coating material covering at least the printed areas on both sides of said core layer, said overcoating layer on each side of said core being between 0.5 and 2.0 mils in thickness and each of said overcoating layers being selected from the group consisting of low density polyethylene, copolymers of ethylene and vinyl acetate, polyethylene ionomers, nitrocellulose lacquer, polyamide based varnish and phenolic alkyd linseed varnish.

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**3,978,261**

## ELASTOMERIC PARTICLES HAVING POLYMERIZABLE SURFACE LAYER

**David Norman Ford, East Doncaster, and Howard William Tankey, Box Hill North, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia**

**Filed Apr. 1, 1974, Ser. No. 456,980**

**Claims priority, application Australia, Apr. 6, 1973, 2919/73**

**Int. Cl.² B32B 7/02, 5/16, 19/02**

**U.S. Cl. 428—212** **12 Claims**

1. A heterogeneous elastomeric particle comprising an elastomeric core whose primary glass transition temperature is below the lowest temperature to which the polymeric composition is likely to be subjected surrounded by a surface layer formed from a polymerizable compound, said surface layer having a glass transition temperature above room temperature and being capable of forming free radicals and being covalently bonded to the elastomeric core, the elastomeric core containing finely divided particles chosen from the group consisting of titanium oxides and iron oxides wherein the finely divided particles are in the size range of 0.01 to 1 micron and the proportion of finely divided particles in the elastomeric core is in the range of 0.1 to 50% W/W and being substantially inert such that the core will not readily generate free radicals under the conditions in which the surface layer readily forms free radicals and will absorb less solvent than 150% w/w of the core.

3,978,262

## METHOD OF SIZING TEXTILE FIBERS USING WATER-SOLUBLE SULFONATED POLYESTERS AND PRODUCTS SO MADE

**Jacques Fritz, Champagne Au Mt D'Or; Paul Roux, Fontaine sur Saone, and Jean Neel, Lyon, all of France, assignors to Rhone-Progil, Paris, France**

**Division of Ser. No. 371,534, June 19, 1973, abandoned. This application Dec. 26, 1974, Ser. No. 536,423**

**Claims priority, application France, July 13, 1972, 72.26094; Jan. 10, 1973, 73.01358**

**Int. Cl.² D06M *11/00***

**U.S. Cl. 428—265** **6 Claims**

1. A method of sizing textile fiber comprising applying the water-soluble sulfonated polyester which results from the sulfonation and polycondensation of an aromatic diacid, its anhydride, or a diester thereof with a saturated glycol, said sulfonation being on the unsaturated chains, to textile fibers in sufficient amounts to act as sizing agents to give abrasion resistance to the fibers sufficient to permit subsequent weaving, wherein said water-soluble sulfonated polyester comprises the polycondensation product of:

a. an aromatic diacid, the anhydride thereof, or the methyl, ethyl, propyl, or butyl diester thereof, said aromatic diacid being selected from the group consisting of orthophthalic acid, isophthalic acid, terephthalic acid, and

b. an unsaturated diacid, the anhydride thereof, or the methyl, ethyl, propyl or butyl diester thereof, said aliphatic acid being selected from the group consisting of maleic acid, fumaric acid and itaconic acid, and

c. a saturated glycol selected from the group consisting of ethylene glycol, propylene glycol, butylene glycol and di- and tri-ethylene glycols.

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3,978,263

## WATER-PERMEABLE FLOOR COVERING BOARDS

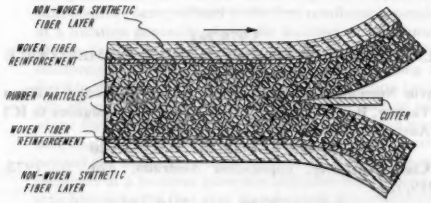
**Günther Wellensiek, Bonn-Bad Godesberg, Germany, assignor to Verton & Wellensiek, Bonn-Bad Godesberg, Germany**

**Continuation-in-part of Ser. No. 130,827, April 2, 1971, abandoned. This application Aug. 12, 1974, Ser. No. 496,727**

**Claims priority, application Germany, Mar. 8, 1971, 2110972**

**Int. Cl.² B32B *5/18***

**U.S. Cl. 428—306** **12 Claims**




1. A process for producing in a single molding operation water-permeable, uniformly dimensioned elastic floor covering boards having a resilient, water-permeable backing layer of adhesively bonded rubber particles, and a water-permeable surface layer of adhesively bonded synthetic fibers, said layers being firmly bonded together, comprising the steps of

a. depositing in a mold a layer of non-woven synthetic fibers,

b. impregnating said layer of synthetic fibers with a resilient polyurethane adhesive,

c. depositing on top of said layer of adhesive-impregnated synthetic fibers a layer of natural or synthetic rubber particles having a particle size of between 0.2 and 4.0 cm., said particles being impregnated with a resilient polyurethane adhesive,

d. incorporating a foaming agent for said adhesive,

e. closing said mold, and

f. subjecting said layers in the closed mold to a temperature between room temperature and 100°C. and to a pressure between about 40 and about 100 metric tons per square meter for a period of time sufficient to effect curing of said adhesive, whereby a foamed adhesive matrix is produced in said floor covering boards.

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3,978,264

## COATING FOR POROUS SURFACES

**Harlan E. Tarbell, Torrance; Donald W. Mogg, Redondo Beach, and David L. Ruff, Torrance, all of Calif., assignors to Grefco, Inc., Bala Cynwyd, Pa.**

**Filed June 20, 1975, Ser. No. 588,816**

**Int. Cl.² B32B *3/26, 5/18, 23/00***

**U.S. Cl. 428—314** **10 Claims**

1. In a composite product having a polymer foam layer applied to the surface of a porous substrate, the improvement comprising a barrier coating between said surface of said porous substrate and said foam layer wherein said coating comprises a cured, cross-linked formulation of a hydroxyl group containing material selected from the group consisting of starch, cereal grain flour, and mixtures thereof, and a thermosetting resin selected from the group consisting of urea formaldehydes, phenol formaldehydes, melamine formaldehydes, and mixtures and interpolymers thereof which cures through methylol groups.

2 The improvement of claim 1 wherein said aqueous formulation further comprises on a solids basis about 0.2 to about 5.0 weight percent of a biocide.

9. The improvement of claim 1 wherein said composite product is a rigid substantially flat board product comprising a rigid porous substrate board, said barrier coating applied to the surface of said board, a rigid foam layer applied to the surface of said barrier coating and a top skin on the foam layer.

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3,978,265

## GASKET MATERIAL

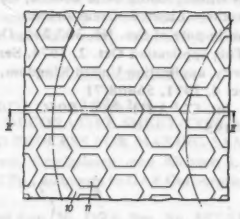
**Edward Francis Herbert Benjamin Hillier, and Robin Anthony Walker, both of Cheltenham, England, assignors to Dowty Seals Limited, Tewkesbury, England**

**Filed Oct. 29, 1974, Ser. No. 518,736**

**Claims priority, application United Kingdom, Nov. 10, 1973, 52281/73**

**Int. Cl.² B32B *3/26, 5/18***

**U.S. Cl. 428—315** **1 Claim**




1. An imperforate sheet of gasket material from which gaskets can be made, said sheet comprising a matrix of a material which is elastically-compressible whereby it has substantial sealing ability, and a plurality of discrete volumes, contained in said matrix, which are of a material having a high modulus of elasticity, being thereby substantially-rigid, said discrete volumes being so distributed in said matrix that (i) upon compressing he sheet between opposed surfaces to be sealed, initially the matrix material solely resists compression

and only thereafter do the discrete volumes also resist compression, and (ii) the mean rate of compression over any area of the sheet is substantially the same as the mean rate of compression over another area of the sheet when the areas are similarly compressed, said distribution of said volumes being such that along planes which are parallel to the surfaces of the sheet and which intersect said volumes it is impossible to draw a straight line without passing through one at least of said volumes.

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**3,978,266**

## SURGICAL DRESSINGS

**Peter Maurice Lock, Gillingham, England, assignor to Ionics Lyo Products Company, Watertown, Mass.**

**Continuation-in-part of Ser. No. 295,236, Oct. 5, 1972. This application Sept. 13, 1973, Ser. No. 396,677**

**Claims priority, application United Kingdom, Sept. 10, 1973, 46252/73**

**The portion of the term of this patent subsequent to Aug. 17, 1993, has been disclaimed.**

**Int. Cl.² C08G *18/14***

**U.S. Cl. 428—315** **8 Claims**

1. An integrally formed, non-laminated, non-rigid, open celled polyurethane foam wound dressing material comprising a foam based on a polyether formulation employing stannous octoate and a chlorofluoromethane wherein at least one of the surfaces of said material consists of a surface layer having a density substantially greater than the remaining portions of the said foam material; said dense surface layer being absorbent to aqueous based liquids in a manner and amount substantially similar to conventional cotton gauze or cotton wool wound dressings and comprised of open foam cells which are irreversibly partially collapsed as contrasted to the foam cells of said remaining portions of the material which are substantially uncollapsed and non-absorbent to aqueous based liquids.

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**3,978,267**

## COMPACT TWISTLESS TEXTILE YARN COMPRISING DISCONTINUOUS FIBER BONDED BY POTENTIALLY ADHESIVE COMPOSITE FIBERS

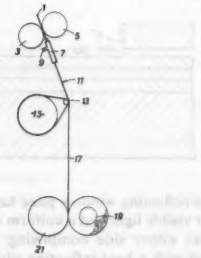
**Alan Selwood, Newport, England, assignor to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 357,576, May 7, 1973, abandoned, Division of Ser. No. 141,713, May 10, 1971, Pat. No. 3,745,757. This application Feb. 24, 1975, Ser. No. 552,264**

**Claims priority, application United Kingdom, May 20, 1970, 24421/70**

**Int. Cl. B32B *27/00*; D02G *3/00*; B32B *27/02***

**U.S. Cl. 428—360** **12 Claims**



1. A compact yarn comprising an assembly of discontinuous fibres, substantially free of continuous twist consisting of at least a proportion of potentially adhesive composite fibres selected from the group consisting of polyamide fibres and polyester fibres, said composite fibres comprising two components one of which is potentially adhesive and forms at least part of the surface of the composite fibres, said composite fibres being bonded by means of said potentially adhesive component to contacting fibres such that the bonded yarn has a linear density of up to 33 tex, an average stripping force as defined of at least 1.0g, a tenacity of at least 0.5g/dtex and a yarn stiffness as defined of less than 0.005.

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**3,978,268**

## ELECTROCONDUCTIVE ELASTIC SPONGE MEMBER

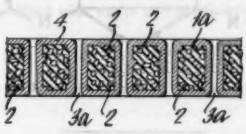
**Hiromi Kameda, Toyokawa, and Sanji Inagaki, Okazaki, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Oct. 17, 1974, Ser. No. 515,758**

**Claims priority, application Japan, Oct. 23, 1973, 48-119514; Aug. 13, 1974, 49-93129**

**Int. Cl.² B32B *9/04***

**U.S. Cl. 428—368** **10 Claims**



1. An electroconductive elastic sponge member having an electrical resistivity in the range of $10^2$ to $10^4$ ohm/cm which varies inversely with the pressure applied thereto comprising a foamed organic polymeric base material temporarily expandable by methyl or ethyl alcohol and coated with an electroconductive additive agent including a mixture of 10 parts by weight of a water dispersable binding resin, 2 to 7 parts by weight of a fine electroconductive powder and 10 to 200 parts by weight of said base material expandable alcohol.

9. The method of producing an electrically conducting elastic sponge material comprising applying to a soft elastic open pore sponge matrix formed of a polymeric material which is temporarily expandable when ethyl or methyl alcohol is applied thereto, a liquid composition including 10 parts by weight of a water dispersable resin binder and 2 to 7 parts by weight of a finely divided electroconductive powder dispersed in 10 to 200 parts by weight of said alcohol and thereafter evaporating said alcohol to leave a coating of said electroconductive powder and binder in the surface of said sponge matrix.

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**3,978,269**

## HOLLOW PELLETS AND METHOD OF MAKING SAME

**Robert M. Martin, Golden, Colo., assignor to Coors Porcelain Company, Golden, Colo.**

**Division of Ser. No. 419,019, Nov. 26, 1973, Pat. No. 3,875,273, Continuation-in-part of Ser. No. 383,628, July 30, 1973, Pat. No. 3,875,271. This application Dec. 12, 1974, Ser. No. 532,270**

**Int. Cl.² B01J *35/08*; B32B *1/06***

**U.S. Cl. 428—403** **1 Claim**

1. A pellet having a hollow center completely surrounded by a generally spherical shell, the exterior surface of said shell being of a porous sintered ceramic and the interior surface of said shell being of material different than said sintered ce-

ramic and being a catalytic material, said catalytic material being present only on the interior surface of said shell.

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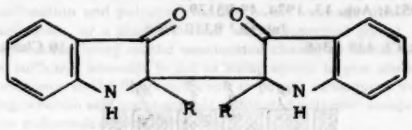
**3,978,270**

## THERMAL SENSITIVE MATERIALS

**Kenneth D. Glanz, Appleton, Wis., and David B. McQuain, Dayton, Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed Nov. 12, 1975, Ser. No. 631,336**
**Int. Cl.² B41M *5/12, 5/18***
**U.S. Cl. 428—411** **12 Claims**

**1.** A thermal sensitive sheet material comprising a substrate and an associated, substantially colorless, dehydroindigo di-(alkyl acylate) having the following structure:



where R is alkyl acylate having from three to nine carbon atoms.

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**3,978,271**

## THIN METALLIC NICKEL-SILVER FILMS BY CHEMICAL REPLACEMENT

**Charles B. Greenberg, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 15, 1975, Ser. No. 568,351**
**Int. Cl.² C03C *17/14***
**U.S. Cl. 428—433** **17 Claims**

**1.** A method of preparing a metallic film of silver and nickel on a non-metallic substrate comprising the steps of:

a. sensitizing a surface of the substrate;
b. applying a nickel film to the sensitized surface;
c. contacting the nickel film with a replacement solution containing an ammoniacal silver salt and a nickel complexing agent for a period of time sufficient to replace at least a portion of the nickel in the film by silver.

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**3,978,272**

## COATED ARTICLE FOR SOLAR CONTROL AND PROCESS FOR ITS PRODUCTION

**Harold E. Donley, Oakmont, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Mar. 13, 1974, Ser. No. 450,908**
**Int. Cl.² B05D *5/06*; B32B *15/04, 17/06*; F24J *3/02***
**U.S. Cl. 428—434** **23 Claims**

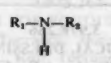
**1.** A process for forming a coated glass article comprising the steps:

1. contacting a heated glass substrate at a temperature of at least about 800°F. with a solution or suspension of a silver compound which thermally decomposes to form metallic silver film upon contact with the heated substrate, thereby forming a glass article having a pyrolytically deposited metallic silver film upon said glass substrate,
2. contacting the metallic silver coated substrate at a temperature of at least about 800°F. with a solution or suspension of a metal compound which thermally decomposes to form a metal oxide film upon contact with the substrate, thereby producing a coated glass article having a first film of pyrolytically deposited metallic silver and a second film of pyrolytically deposited metal oxide upon said first film.

**2.** A process according to claim **1** wherein steps 1 and 2 are accomplished by heating the glass substrate to a temperature between about 800°F. and 1400°F., and are conducted in rapid sequence and where the resultant coated glass substrate is subsequently cooled to about 300°F. within about 20 minutes after the films are applied.

**3.** A process according to claim **2** wherein the successive films are deposited on a glass substrate by contacting a surface of the heated substrate in sequence with coating compositions comprising:

1. first, a silver coating composition comprising:
   a. about 0.2 to about 28 percent by weight of silver present as a silver soap of an organic acid having about 2 to 10 carbon atoms;
   b. an amine having the structure:



   wherein $R_1$ and $R_2$ are selected from the class consisting of hydrogen and organic moieties containing less than about 10 carbon atoms; and
   c. a solvent wherein the quantity of said amine is sufficient to solubilize said silver soap in said solvent, and
2. second, a metal oxide coating composition comprising:
   a. a metal diketonate, and
   b. a solvent.

**4.** A process according to claim **3** wherein the glass substrate is a clear transparent glass substrate and both the silver film and the metal oxide film are transparent.

**7.** An article of manufacture produced according to the process of claim **4**, which article can be silver-gold through red appearing by reflection and blue to green appearing by transmission, the thicknesses of the silver and metal oxide films being such that the article has the following solar and specular properties:

| | | |
|---|---|---|
| a. | total solar energy reflectance | 45–65% |
| b. | infrared reflectance | 51–75% |
| c. | luminous reflectance | 11–68% |
| d. | luminous transmittance | 9–31% |
| e. | dominant wavelength of reflected light | 572–499.4c nm |
| f. | excitation purity of reflected light. | 15–49% |

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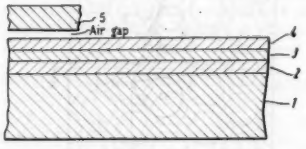
**3,978,273**

## HEAT-REFLECTING WINDOW PANE

**Rolf Groth, Witten, Germany, assignor to Flachglas Aktiengesellschaft Delog-Detag, Germany**

**Filed July 1, 1974, Ser. No. 484,609**
**Claims priority, application Germany, July 5, 1973, 2334152**
**Int. Cl.² G02B *1/10*; B05D *5/06***
**U.S. Cl. 428—434** **13 Claims**




**1.** A heat-reflecting window pane having a transmissivity of 20–60% for visible light and a uniform neutral gray color when viewed from either side comprising: a transparent support layer coated with a heat-reflecting silver layer, an absorption layer selected from the group consisting of metals, metalloids and metal alloys disposed between the silver layer and the transparent support layer, said absorption layer having a thickness to provide a light transmissivity of the laminate consisting of the transparent support layer and the absorption layer which is 10–65% less than that of the transparent support layer, the refractive index and the absorption coefficient

of the absorption layer being of the same order of magnitude for visible light, and an anti-reflection layer of refractive dielectric material which is substantially absorption-free for visible light and has a refractive index of more than 1.7 disposed on the other side of the silver film from the absorption layer.

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3,978,274

## ADHESIVE TAPE HAVING PRINTABLE RELEASE COATING

Alfred Blum, Skokie, Ill., assignor to Borden, Inc., Columbus, Ohio

Filed July 15, 1974, Ser. No. 488,322
Int. Cl.[2] C09J 7/04
U.S. Cl. 428—476 11 Claims

1. A normally tacky pressure-sensitive adhesive tape comprising a backing, a normally tacky and pressure-sensitive adhesive coat on one side of said backing and a printable release coat on the opposite side of said backing, said release coat comprising, in parts by weight per 100 parts by weight of said release coat, 10 to 60 parts vinyl film former, 10 to 60 parts acrylic resin and 20 to 80 parts polyamide plasticizer resin, said vinyl film former is selected from polyvinyl chloride, polyvinyl acetate, vinyl butyral resins, copolymers of vinyl chloride and vinyl acetate, vinyl alcohol-acetate resins, copolymers of vinyl chloride and vinylidene chloride, copolymers of vinyl chloride and acrylonitrile and said vinyl film formers modified with butadiene elastomers; said acrylic resin is selected from polymers of $C_1$ to $C_8$ alkyl esters of methacrylic acid, copolymers of $C_1$ to $C_8$ alkyl methacrylates with less than 50% by weight of $C_1$ to $C_8$ alkyl acrylates, copolymers of $C_1$ to $C_8$ alkyl acrylates with styrene, and mixtures thereof; and said polyamide resin is selected from linear polyamide resins which are obtained by condensing polyfunctional amines with dimeric and trimeric fatty acids and such polyamide resins modified with waxes and plasticizers.

3,978,275

## TELECOMMUNICATION CABLE AND METHOD AND APPARATUS FOR MANUFACTURING THE SAME

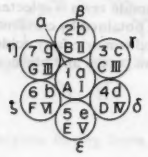
Koshi Ishihara, and Akira Sakamoto, both of Mito, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Jan. 29, 1975, Ser. No. 544,956

Claims priority, application Japan, Feb. 8, 1974, 49-16105; Mar. 25, 1974, 49-33284

Int. Cl.² H01B *11/02*

U.S. Cl. 174—34 6 Claims



1. A telecommunication cable comprising:

a plurality of conductor units bundled together, each conductor unit occupying a prescribed position in the cross-section of the cable and each conductor unit including at least four conductor pairs; and

a plurality of lengthwise adjacent continuously connected sections, the conductor pairs of the conductor units being systematically interchanged in position relative to other conductor pairs of its respective conductor unit at each of said adjacent sections and said conductor pairs being systematically interchanged between conductor units at selected ones of said adjacent sections, so that both the grouping of said conductor pairs and the positions of said conductor units are systematically changed along the length of the cable to decrease the length over which any two conductor pairs are immediately adjacent each other, thereby reducing crosstalk among the conductor pairs.

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3,978,276

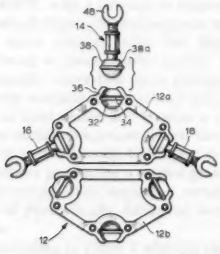
## SPACER-DAMPER

James C. Poffenberger, Cleveland Heights; William F. Corkran, Shaker Heights; Ralph B. Siter, Jr., Mentor, and Raymond J. Champa, Macedonia, all of Ohio, assignors to Preformed Line Products Company, Cleveland, Ohio

Filed May 2, 1975, Ser. No. 573,951

Int. Cl.² H02G *7/12*, *7/14*

U.S. Cl. 174—42 7 Claims



1. A device for maintaining a predetermined minimum spacing between electrical transmission cables or the like and for damping vibratory oscillatory motion of such cables, comprising:

cable connector means comprising a plurality of similar connector structures each having a longitudinal axis, a first end portion for effecting a gripping connection with a cable and a second end portion of a generally spherical, ball-like contour;

rigid spacer means including a plurality of hollow sockets of a generally spherical contour, each said socket receiving respective ones of said ball-like end portions of said cable connector means;

said cable connector means and said spacer means disposed in a common plane;

resilient damping means interposed between said ball-like second end portions of each of said connector structures and the associated receiving sockets of said spacer means; and

means securing said damping means against movement relative to both said ball-like end portions of said connector means and their associated receiving sockets for placing said damping means in shear upon relative pivotal movement of said ball-like end portions and their associated receiving sockets, said securing means including circumferential ribs on said damping means, said ribs mating with complementary circumferential recesses in the respective receiving sockets and in the ball-like end portions, and each said rib and said recess being generally perpendicular to the longitudinal axis of their associated connector structure and to said common plane.

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3,978,277

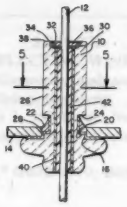
## HIGH VOLTAGE TERMINAL BUSHING FOR USE IN HIGH VOLTAGE CIRCUITS

Robert H. Turnier, Laguna Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 433,420, Jan. 14, 1974, abandoned. This application July 28, 1975, Ser. No. 599,575

Int. Cl.² H01B *17/26*

U.S. Cl. 174—142 3 Claims



1. A high voltage insulating bushing comprising:

a substantially circular insulating bushing body;

a conductor;

a hole through said bushing body through which said conductor passes;

means attaching and sealing said conductor to said bushing body;

a flat wall having a hole with an edge;

said bushing body electrically separating said conductor from said wall;

a recess of semispherical shape in cross-section overlapping said edge of the wall;

a shoulder, beneath said recess, for positioning against said wall;

metalization applied to said shoulder and to a portion of said recess for application of solder to said metalization for attachment of said bushing body to said wall;

said recess having two sharp corners at the point where said recess meets the external surface of said bushing body, the first corner having metalization thereon and the sec-

ond corner of said recess being free of metalization in order to eliminate corona from said bushing body and said conductor;

solder applied to said metalization and securing said bushing body to said wall, said solder stopping short of said second corner;

a plastic insulator for insulating said conductor; and

said insulator being positioned in said hole through said bushing body between said bushing body and said conductor.

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## 3,978,278
## VIDEODISC READER WITH CONCAVE MIRROR ELEMENTS

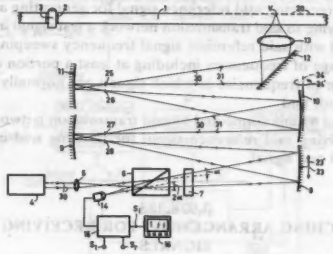
**Gijsbertus Bouwhuis; Adrianus Jacobus Jozef Franken, and Carel Arthur Jan Simons, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 29, 1974, Ser. No. 464,788**

**Claims priority, application Netherlands, Feb. 15, 1974, 7402169**

**Int. Cl.² G11B 7/00**

**U.S. Cl. 178—6.6 R** **5 Claims**



1. An apparatus for reading a record carrier on which information is stored in track in an optical readable structure, said apparatus comprising a radiation source which supplies at least a read beam, an objective system for focussing the read beam to a read spot on the information structure of the record carrier, beam-controlling elements for deflecting the read spot over the record carrier, a radiation-sensitive detection system for converting the read beam which is modulated by the information structure into an electrical signal, and a mirror system in the radiation path from the radiation source to the objective system comprising a first concave mirror means for forming an image of the read spot and a second mirror means for imaging the entrance pupil of the objective system onto the beam-controlling elements, wherein said mirror means is positioned in said radiation path between said objective system and said beam controlling elements.

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## 3,978,279
## METHOD AND APPARATUS FOR SIMULTANEOUSLY MODULATING WITH PICTURE, SOUND AND COLOR SIGNALS THE INCIDENCE OF A RECORDING LIGHT BEAM ON A MOVING RECORD MEDIUM

**Manfred Boruschewitz, and Klaus Kutle, both of Berlin, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Apr. 2, 1975, Ser. No. 564,340**

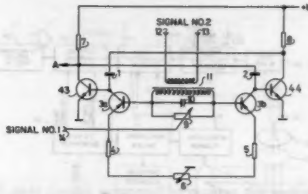
**Claims priority, application Germany, Apr. 13, 1974, 2418175**

**Int. Cl.² H04N 5/76**

**U.S. Cl. 178—6.6 DD** **6 Claims**

1. Apparatus for recording a picture signal and two additional signals on a single optical record track on a moving record medium by means of a beam of radiant energy capable of modifying the surface of said medium at its incidence thereon, comprising:

means for modulating the incidence of said radiant energy beam upon said moving record medium at main carrier and auxiliary carrier frequencies, said means for modulating at one of said carrier frequencies including an astable multivibrator having a pair of timing capacitors associated respectively with semiconductor devices by which current for altering the charge state of said capacitors can be controlled, said multivibrator being connected so as to supply one of said carrier frequencies, means for simulta-




neously changing the current passing capability of both of said semiconductor devices in the same direction of change in accordance with a first modulating signal and thereby modulating the frequency of the carrier provided by said multivibrator, and and means for providing differential modulation of the current passing capability of said semiconductor devices by a second modulating signal and thereby producing duty cycle modulation of the frequency modulated output of said multivibrator independently of the frequency modulation thereof, said second modulating signal being a signal other than said picture signal.

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## 3,978,280
## IMAGE ANALYSIS APPARATUS

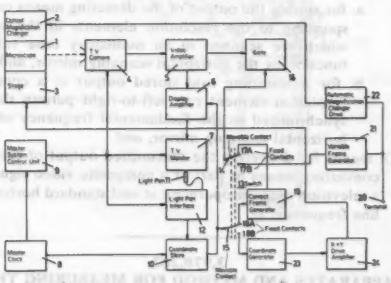
**Lawrence Grote Kavanagh, and Brian Martin Hopkins, both of Huntingdon, England, assignors to Becton, Dickinson and Company, Rutherford, N.J.**

**Filed Apr. 5, 1974, Ser. No. 458,284**

**Claims priority, application United Kingdom, Apr. 6, 1973, 16664/73**

**Int. Cl.² H04N 7/18**

**U.S. Cl. 178—6.8** **8 Claims**



1. Image analysis apparatus comprising a cathode ray tube; generating means for generating horizontal and vertical deflection signals connected to the cathode ray tube; a light pen comprising a photoelectric sensor manually movable over the screen of the cathode ray tube; a store which is connected to the output of the photoelectric sensor; and gate means which is connected to the output of the store and to receive video signals applied to the cathode ray tube and which passes only those received video signals occurring within a closed path

defined by points whose coordinates are stored in the store; a television camera, the output of the camera being connected to the cathode ray tube and to the gate means.

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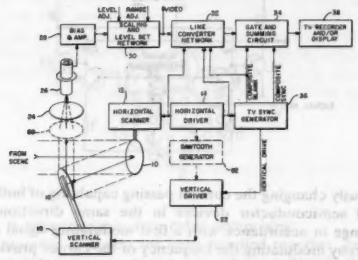
**3,978,281**

## INFRARED IMAGING SYSTEM

**Gordon J. Burrer, 5 Wayland Hills Road, Wayland, Mass. 01778**

**Filed Apr. 14, 1975, Ser. No. 567,939**
**Int. Cl.² H04N** *5/30*
**U.S. Cl. 178—7.7** **9 Claims**




**1.** An infrared energy system comprising:

A. a low inertia horizontal scanning mirror positioned in the optical path from a scene,

B. means for oscillating the horizontal scanning mirror in resonance at a frequency which is an even submultiple of a standard television horizontal line frequency,

C. a low inertia vertical scanning mirror,

D. means for driving the vertical scanning mirror in synchronism with the horizontal scanning mirror so that the scene is scanned in a zig-zag pattern from top to bottom,

E. infrared detecting means positioned beyond the miirrors in the optical path from the scene, said detecting means generating an output representative of the intensity of received infrared energy from the scene,

F. line converting means

1. synchronized to the fundamental frequency of the horizontal scanning mirror,

2. for receiving the output of the detecting means, and

3. alternately

a. for storing the output of the detecting means corresponding to the resolution elements in the scene which are scanned in an oscillatory time variant function by the horizontal scanning mirror, and

b. for transmitting said stored output at a constant resolution element rate left-to-right pattern that is synchronized to the fundamental frequency of the horizontal scanning mirror, and

G. means for delivering the transmitted output of the line converting means as part of a composite video signal to a television receiver operating at said standard horizontal line frequency.

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**3,978,282**

## APPARATUS AND METHOD FOR MEASURING THE TRANSMISSION CHARACTERISTICS OF A NETWORK

**Forrest F. Fulton, Jr., Los Altos Hills, Calif., assignor to Avantek, Inc., Santa Clara, Calif.**

**Filed Feb. 4, 1971, Ser. No. 112,714**
**Int. Cl.² H04N** *7/10;* **G01R** *27/04*
**U.S. Cl. 178—69 G** **25 Claims**

**10.** The method of measuring the transmission response of a transmission network normally carrying operating signals having a predetermined intensity range from a transmitting point to a receiving point comprising the steps of:

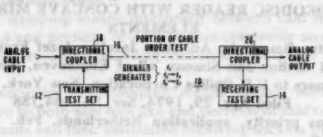
generating at said transmitting point a reference signal sweeping over a range of frequencies;

generating at said transmitting point a test signal having an intensity less than that of said operating signals interrelated in frequency to said reference signal;

transmitting said reference signal and said test signal over the same path between said points;

receiving and tracking said test signal in response to said reference signal at said receiving point.

**20.** Apparatus for measuring the transmission characteristics of a transmission network over a range of frequencies in which signals are normally transmitted at a predetermined intensity range comprising




means for generating and for applying to said transmission network a reference signal sweeping over a range of frequencies outside said range of frequencies in which signals are normally transmitted in said network,

means receiving said reference signal for generating and for applying to said transmission network a test signal interrelated with said reference signal frequency sweeping over a range of frequencies including at least a portion of said range of frequencies in which signals are normally transmitted, and

receiver means connected to said transmission network and receiving said reference signal for tracking said interrelated test signal.

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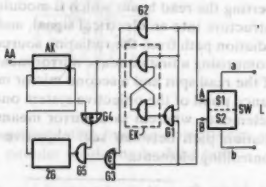
**3,978,283**

## SWITCHING ARRANGEMENT FOR RECEIVING DC SIGNALS

**Herbert Reiter, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Continuation of Ser. No. 529,495, Dec. 4, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,638**
**Claims priority, application Germany, Dec. 4, 1973, 2360376**
**Int. Cl.² H04L** *25/06;* **H03K** *5/153*
**U.S. Cl. 178—69 A** **1 Claim**




**1.** A circuit arrangement for facilitating the undistorted reception of direct current signals comprising:

a receive line over which incoming message signals are received,

threshold circuit means having first and second threshold values, said first threshold value being near the current value indicating the mark of a said message signal and said second value being near the current value indicating the space of a said message signal, said threshold circuit producing a pair of output signals having relative values indicating either the condition that said first threshold value has beed undershot during the descending transition of said message signal, or the condition that said second threshold value has been exceeded during an ascending transition of said message signal,

input bistable circuit means coupled to said threshold circuit outputs, a change in state in said input bistable circuit means occurring only if the output signals of said threshold circuit are of equal value,

logic circuit means for providing a first signal when said first threshold value is undershot during a descending transition of a said message signal and a second signal when said second threshold level is exceeded during an ascending transition of a said message signal,

timing means switched in the circuit when said first or said second output signal is produced for emitting a clock pulse at the end of a predetermined period and

output bistable circuit means which is set by an output signal of said input bistable circuit and reset by said clock pulse from said timing means.

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**3,978,284**

## RECEIVER FOR USE IN A MULTI-LEVEL CODE TRANSMISSION SYSTEM

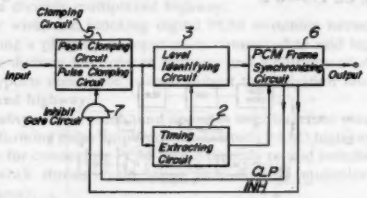
**Takehiko Yoshino, and Katsuo Mohri, both of Yokohama, Japan, assignors to Nippon Hoso Kyokai and Hitachi, Ltd., both of Tokyo, Japan**

**Filed Feb. 1, 1974, Ser. No. 438,680**

**Claims priority, application Japan, Feb. 9, 1973, 48-16199**

**Int. Cl.² H04B *1/00***

**U.S. Cl. 178—69.5 R** **9 Claims**




1. In a multi-level code transmission system in which a code signal, having a frame synchronizing signal and a reference signal representative of a reference level inserted in the code signal at a fixed period, is transmitted, a receiver for receiving said code signal, wherein said receiver comprises:

first means for initially restoring a d.c. component of the received signal by peak-clamping the peak of the received synchronizing signal to a fixed level;

means for establishing the synchronization of the receiver with respect to the received signal having a d.c. component restored;

second means for then restoring a d.c. component of the received signal by pulse-clamping the reference level of the received signal to said fixed level by means of a clamping pulse synchronized to the received signal; and

means for enabling said first or second means for restoring according to whether or not the synchronization of the receiver is established.

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**3,978,285**

## FRAME SYNCHRONIZING DEVICE

**Yoichi Tan, and Shinji Ono, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed June 12, 1975, Ser. No. 586,450**

**Claims priority, application Japan, June 13, 1974, 49/67695**

**Int. Cl.² H04L *7/08***

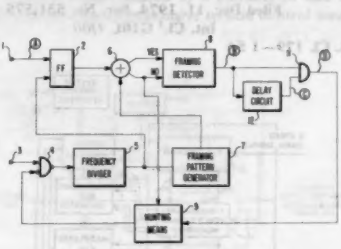
**U.S. Cl. 178—69.5 R** **1 Claim**

1. A frame synchronizing device for a digital transmission system comprising:

a comparison circuit for comparing input data with a local framing signal and for providing comparison outputs therefrom,

a framing detector operable in response to said comparison outputs to generate a framing status output,

delay circuit means connected to said framing detector output for retarding said framing status output,




an AND gate circuit arranged to receive the output signals from said framing detector and said delay circuit and providing a control output signal therefrom, and

hunting means operable in response to said control output to time-shift said local framing signal for establishing reframing.

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**3,978,286**

## ARTIFICIAL LARYNX

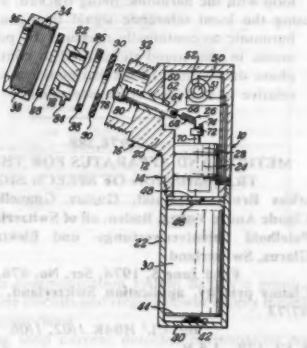
**Bernard William Watson, 60A Meadway, Harpendon, Hertfordshire, England**

**Filed Oct. 18, 1974, Ser. No. 515,899**

**Claims priority, application United Kingdom, Oct. 31, 1973, 50587/73**

**Int. Cl.² A61F *1/20*; Q10L *1/10***

**U.S. Cl. 179—1 AL** **11 Claims**

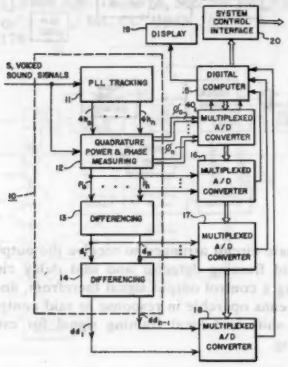


1. A speech device comprising a housing, a diaphragm means, means mounting said diaphragm means with one face thereof exposed as part of the outer surface of the housing for application of said face to a user's throat, a hammer means within said housing, means mounting said hammer means for movement thereof to beat against a portion of said diaphragm means within the housing, drive means for causing said hammer means to repeatedly beat against said diaphragm means, and said drive means including a motor and a resilient link between said motor and said hammer means.

## 3,978,287
## REAL TIME ANALYSIS OF VOICED SOUNDS

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Jung P. Hong, Cupertino, Calif.**

**Filed Dec. 11, 1974, Ser. No. 531,575**
**Int. Cl.² G10L 1/00**
**U.S. Cl. 179—1 SA** **27 Claims**




13. A method for obtaining power and phase data on the harmonic content of a voiced sound signal comprising the steps of

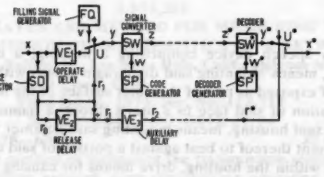
using at least one phase-locked loop having a voltage controlled oscillator for tracking at least one of said harmonics in said signal, said oscillator producing a signal at a frequency that is some multiple of the harmonic being tracked, and developing for each harmonic a local reference signal that is a submultiple of the oscillator frequency by dividing down from the higher oscillator frequency signal that is synchronized by said phase-locked loop with the harmonic being tracked, and

using the local reference signal thus produced for each harmonic to continually measure the power of the harmonic in said sound signal, and to continually generate phase data signals of the harmonic in said sound signal relative to said local reference signal.

## 3,978,288
## METHOD AND APPARATUS FOR THE SECRET TRANSMISSION OF SPEECH SIGNALS

**Markus Bruckner, Basel; Gustav Guanella, Zurich, and Claude Andre Vouga, Baden, all of Switzerland, assignors to Patelhold Patentverwertungs- und Elektro-Holding AG, Glarus, Switzerland**

**Filed June 5, 1974, Ser. No. 476,469**
**Claims priority, application Switzerland, June 12, 1973, 8347/73**
**Int. Cl.² H04K 1/02, 1/06**
**U.S. Cl. 179—1.5 R** **16 Claims**

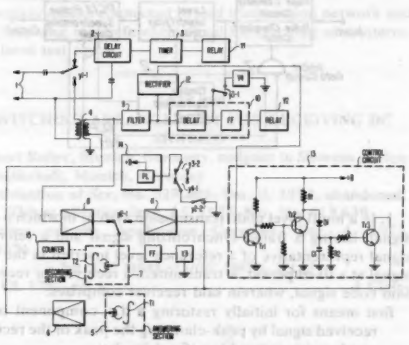



1. A method for the confidential transmission of intelligence signals comprising a plurality of time intervals of voice signals, each voice signal time interval separated from a next voice signal time interval by an interruption time interval, said method comprising the steps of; encoding each voice signal time interval of the intelligence signal; storing at least a selected one of the encoded voice signals; generating an encoded auxiliary signal during each interruption time interval; filling each interruption time interval of the intelligence signal with the stored encoded voice signal to form a substantially encoded message; transmitting only said message on a first channel; transmitting said encoded auxiliary signal on a separate second channel; receiving the substantially continuous encoded message and encoded auxiliary signals at a receiver end; decoding the encoded auxiliary signal; suppressing the encoded signals occurring during the interruption time intervals at the receiver end by use of the decoded auxiliary signal and decoding the remaining encoded signals.

## 3,978,289
## REMOTE-CONTROLLED AUTOMATIC TELEPHONE-ANSWERING AND MESSAGE-RECORDING APPARATUS

**Akira Konno, Kawagoe, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Feb. 18, 1975, Ser. No. 550,673**
**Claims priority, application Japan, Feb. 16, 1974, 49-18799**
**Int. Cl.² H04M 1/64, 11/10**
**U.S. Cl. 179—6 E** **6 Claims**




1. In a remote-controlled automatic telephone-answering and message-recording apparatus connected to a telephone line and of the type including a recording circuit for recording incoming messages on a message tape which can be rewound to a predetermined position and reproduced and played back during a playback cycle through a playback circuit in response to a first remote control signal transmitted over the telephone line, and wherein the first remote control signal is recorded on the message tape when the signal is transmitted while an incoming message is being recorded on the message tape during a recording cycle, the improvement comprising:

rewind means coupled to the telephone line and operative in response to a subsequent remote control signal transmitted, during the playback cycle initiated by the first control signal, over the telephone line to rewind the message tape, said subsequent control signal having the same frequency as said first control signal, and

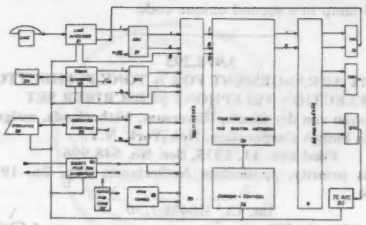
control circuit means coupled to the recording or playback circuit for preventing operation of said rewind means when the first remote control signal is reproduced.

3,978,290

## DIGITAL PRIVATE AUTOMATIC BRANCH EXCHANGE

Bhupendra Nath Sarma, 72 Scales Road, London, N.17, England

Filed Oct. 8, 1974, Ser. No. 513,062
Claims priority, application United Kingdom, July 12, 1974, 31008/74
Int. Cl.² H04J 3/00
U.S. Cl. 179—15 AT 9 Claims



1. A telecommunication switching system for switching between line, trunk, and operator inlets, comprising:

an input time division multiplexed highway and an output time division multiplexed highway;

a four wire, non blocking digital PCM switching network having a plurality of input ports connected to said input time division multiplexed highway and a plurality of output ports connected to said output time division multiplexed highway;

a plurality of line, trunk, and operator inlet interface means for forming pulse amplitude modulated (PAM) highways;

means for connecting PCM trunks directly to said switching network through said input time division multiplexed highway;

means for connecting PCM tones directly to said switching network through said input time division multiplexed highway;

analog-to-digital conversion (ADC) means for converting said PAM highways to PCM information;

means for multiplexing said PCM information from said ADC means, direct PCM trunk connecting means, and PCM tone connecting means, to form said input time division multiplexed highway;

means for demultiplexing said outlet time division multiplexed highway to provide a group of channels;

digital-to-analog conversion (DAC) means for providing PCM to analog code conversion of said channels; and

a means for providing said four wire, non-blocking digital network with an ability to provide double connection (three port) between said plurality of input ports.

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3,978,291

## AUTOMATED MAIN DISTRIBUTING FRAME SYSTEM

Robert Francis Bergeron, Jr., Budd Lake, N.J., and Hamilton Southworth, Jr., New York, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 9, 1974, Ser. No. 504,294
Int. Cl.² H04Q 1/18; H04M 3/00
U.S. Cl. 179—16 R 37 Claims

1. In a telephone system, an automated main distributing frame system comprising, in combination:

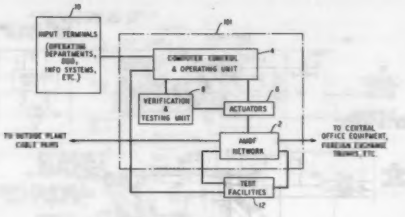
an interconnection network comprising a plurality of serially related cross-connection stages with each said stage including a plurality of cross-connection devices, each said device including inputs and outputs;

terminals connected to the first and last ones of said stages;

conductor means interconnecting said stages in a predetermined pattern;

control means for determining an exclusive path through said network for interconnecting one of said terminals with another of said terminals, said exclusive path including an exclusive cross connection in at least one of said stages;

common actuator means shared by a plurality of said devices and automatically responsive to said control means


INPUT TERMINALS (OPERATING DEPARTMENTS, DDD, INFO SYSTEMS, ETC.)
COMPUTER CONTROL & OPERATING UNIT
VERIFICATION & TESTING UNIT
ACTUATORS
TO OUTSIDE PLANT CABLE PAIRS
AMDF NETWORK
TO CENTRAL OFFICE EQUIPMENT, FOREIGN EXCHANGE TRUNKS, ETC.
TEST FACILITIES

for interconnecting respective ones of said inputs and outputs on one said device in at least one said stage to establish said exclusive cross connection without disturbing other said exclusive cross connections on said plurality of devices sharing said actuator, whereby said exclusive path is established to interconnect said one and said another of said terminals.

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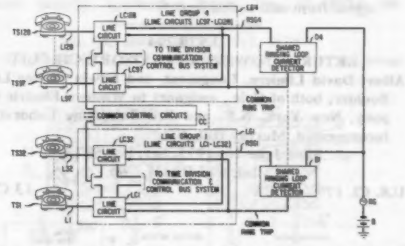
3,978,292

## RINGING CONTROL CIRCUITRY WITH SHARED RINGING LOOP CURRENT DETECTOR

Donald Gifford Hill; Theras Gordon Lewis, both of Boulder, and Patrick Alban Vachon, Arvada, all of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 7, 1974, Ser. No. 521,651
Int. Cl.² H04M 19/02
U.S. Cl. 179—18 HB 14 Claims


LINE GROUP 4 (LINE CIRCUITS LC0F–LC0B)
LINE CIRCUIT
TO TIME DIVISION COMMUNICATION & CONTROL BUS SYSTEM
SHARED RINGING LOOP CURRENT DETECTOR
COMMON CONTROL CIRCUITS
LINE GROUP 1 (LINE CIRCUITS LC1–LC32)
COMMON RING TRIP

7. For use in a communication system having a group of communication line circuits and ringing power supply means, the invention comprising

a single ringing loop current detector permanently connected concurrently to each of said line circuits during ringing and communication intervals and for detecting loop current flow over a called line during an application of ringing power from said supply means to said called line,

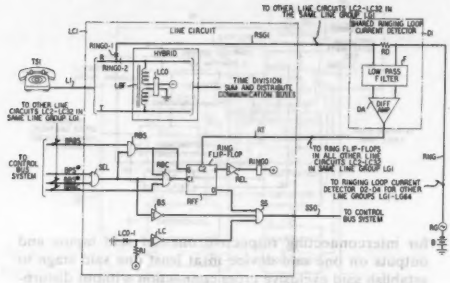
means in each one of said line circuits responsive to a receipt of control signals for controlling a connection of said detector through said one of said line circuits to a called line connectable thereto, and

switch means controlled by said controlling means for connecting said detector and said ringing power supply means to said called line connectable to said one of said line circuits.

## 3,978,293
## RINGING CONTROL CIRCUITRY WITH SHARED RINGING LOOP CURRENT DETECTOR

**Alexander Feiner, Rumson, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Nov. 7, 1974, Ser. No. 521,734**
**Int. Cl.² H04M 3/02**
**U.S. Cl. 179—18 HB** **8 Claims**




1. For use in a communication system having a group of communication line circuits, a switching network for establishing call connections for said line circuits, and incoming call signaling means,

the invention comprising

means connecting incoming call alerting signals from said signaling means to said line circuits independent of said network and being shared by said circuits for detecting call answer signals for each of said circuits, and

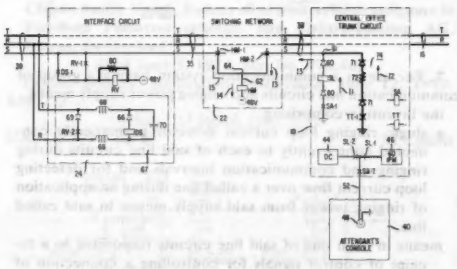
each one of said line circuits having signaling control means activated in response to a receipt of control signals for connecting an incoming call alerting signal from said detecting means to a called line and

means subsequently responsive to said detecting means detection of an answer signal on said called line for deactivating said control means to disconnect said alerting signal from said called line.

## 3,978,294
## RETURN ANSWER-SUPERVISORY CIRCUIT

**Albert David Limiero, Longmont, and Edwin Walter Lipien, Boulder, both of Colo., assignors to Western Electric Company, New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed June 16, 1975, Ser. No. 587,060**
**Int. Cl.² H04M 7/06**
**U.S. Cl. 179—27 CA** **13 Claims**




1. In a telephone switching system having a local PBX, a distant PBX, tie trunks interconnecting said local PBX with said distant PBX, an attendant's console having a plurality of lamps at said local PBX, a matrix type switching network in said local PBX, tie trunk circuitry connected to one side of said network and attendant console control circuitry connected to another side of said network, means for extending a call over one of said tie trunks from said local PBX to a called station in said distant PBX, said local PBX further having a return answer supervisory circuit comprising:

means responsive to said extension for signaling one of said lamps on said attendant's console in a first unique code,

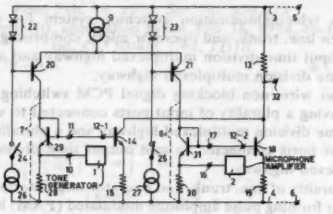
means responsive to the answering of said call by said called station for transmitting an attendant lamp control signal from said tie trunk circuit through said network to said attendant console control circuitry, and

means responsible to said transmitted signal for signaling said lamp in a second unique code.

## 3,978,295
## CIRCUIT ARRANGEMENT FOR A TONE PUSHBUTTON SELECTION TELEPHONE SUBSCRIBER SET

**Petrie Johan van der Plaats, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 11, 1975, Ser. No. 548,996**
**Claims priority, application Netherlands, Feb. 26, 1974, 7402574**
**Int. Cl.² H04M 1/50**
**U.S. Cl. 179—84 VF** **4 Claims**



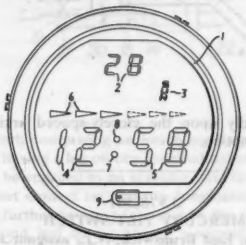

1. A circuit arrangement for a tone pushbutton selection telephone subscriber set comprising two line connection terminals, a tone generator for supplying tone signals to the connection terminals, a microphone amplifier for supplying speech signals to said connection terminals, a constant current source connected to one of said connection terminals, first and second gate networks connected in parallel and connecting a side of said constant current source remote from said one of said connection terminals to the other of said two line connection terminals, each of said gate networks comprising switching means for selectively permitting current to pass through a respective gate network in which said switching means is included, said switching means of said two gate networks being operated alternately, a circuit arrangement output terminal connected to a first of the connection terminals, first and second current control means having main current paths connected in parallel between a second of said connection terminals and said circuit arrangement output terminal, each of said current control means having a separate control terminal and providing a current through the main current path thereof proportional to a signal on said control terminal, the control terminal of each current control means being connected to a different one of said gate networks, whereby the DC current through said circuit arrangement output terminal is maintained constant, a first AC connecting means in said first gate network connecting said tone generator to said control terminal of said first current control means for providing an AC signal path between said tone generator and said first current control means in response to a flow of current through said first gate network from said constant current source, and a second AC connecting means in said second gate network connecting said microphone amplifier to said control terminal of said second current control means for providing an AC signal path between said microphone amplifier and said second current control means in response to a flow of current through said second gate network from said constant current source.

3,978,296

## SWITCHING SYSTEM FOR AN ELECTRONIC TIMEPIECE

Tokio Moriya, Chiba, and Hirotomo Hirai, Tokyo, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Mar. 6, 1975, Ser. No. 556,121
Claims priority, application Japan, Mar. 7, 1974, 49-26656
Int. Cl.² H01H 9/00, 19/10
U.S. Cl. 200—4 2 Claims



1. A switching system for an electronic timepiece comprising in combination: an electrically conductive base plate member; a rotary shaft mounted for rotary and axial movement on said base plate; a turnable wheel member having two spaced end portions and connected to said shaft for rotary movement therewith; a printed circuit board connected to said base plate; a pair of electrodes affixed to said printed circuit board in a position to make electrical contact with respective ones of said end portions of said wheel member in response to turning of said wheel member in opposite directions; a spring lever member composed of electrically conductive material mounted on said base plate; three contact pin members mounted on said base plate and having no electrical connection to said base plate; said wheel member, electrodes and contact pin members being positioned such that electrical contact between respective ones of said pair of electrodes and said wheel member is effected in response to rotary movement of said shaft and the electrical contact between respective ones of said three contact pin members and said spring lever member is effected in response to axial movement of said shaft.

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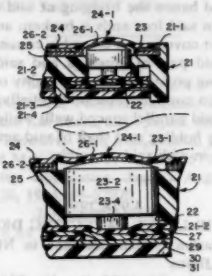
3,978,297

## KEYBOARD SWITCH ASSEMBLY WITH IMPROVED PUSHBUTTON AND ASSOCIATED DOUBLE SNAP ACTING ACTUATOR/CONTACTOR STRUCTURE

William J. Lynn, Groveland, and Richard E. Seeger, Jr., Topsfield, both of Mass., assignors to Chomerics, Inc., Woburn, Mass.

Filed Mar. 31, 1975, Ser. No. 563,707
Int. Cl.² H01H 13/06, 3/12, 5/04
U.S. Cl. 200—5 A 7 Claims

1. In a keyboard assembly including first means for supporting electrically conductive contact means, contactor means positioned over but out of electrical contact with said electrically conductive contact means, a frame for supporting said first means, the improvement of said frame having a plurality of bores, extending from a top surface to a bottom surface thereof, a core positioned in each bore for slideable motion therein, each core having a top surface and a bottom surface a keyboard top of flexible and resilient substantially non-porous material positioned over at least portions of said frame top and sealing said bores at the top surface of the frame, a sheet of flexible and resilient insulator material positioned between the bottom of said cores and said contactor means, said sheet of insulator material having a plurality of raised bubbles, each bubble having at least a snappable curved portion and each bubble extending into a different one of said bores and being surrounded by said bore, each of said bubbles maintaining a portion of each of said cores top surface at least when at rest above the top surface of said frame to which said bores extend and said keyboard top portions sealing each of said bores comprising a raised bubble having a snappable curved surface extending above said bore and extending outwardly beyond the inner wall means defining each of the bores, said keyboard top snappable curved surface over each bore being



depressible to urge said respective core bottom surface to force said respective snappable curved surface extending into the bottom of said bore to urge said contact means against said contactor means, both said snappable curved surfaces snapping upon sufficient depression of the respective snappable surface of the keyboard top to cause said contact means to engage said contactor means whereby a double snap action effect is provided.

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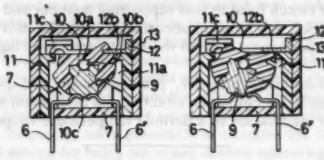
3,978,298

## MINIATURE SWITCH HAVING PIVOTAL ACTUATOR WITH BUDGING CONTACT AND POSITION SAFETY STRUCTURE

Hiroshi Fukuda; Makoto Yoshii, and Wataru Asami, all of Tokyo, Japan, assignors to Matsu Kyu Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 8, 1975, Ser. No. 539,431
Claims priority, application Japan, Jan. 11, 1974, 49-6812[U]
Int. Cl.² H01H 21/18, 1/12, 9/28
U.S. Cl. 200—6 R 8 Claims



1. A miniature switch assembly comprising:

a. a base member including a bottom of four-sided plane and a pair of parallel spaced walls projecting from the respective opposite sides of said bottom;

b. a pair of contacts being disposed between said pair of parallel spaced walls, said each contact being shaped L of which one leg is secured on one of another pair of opposite sides of said bottom, while the other leg has an arcuated portion at the free end, said pair of contacts being disposed such that the free ends of said other legs of said respective L-shaped contacts being opposite to each other;

c. an actuator including an insulating and a conductive portion, said actuator being swingable between a first and a second position around a shaft constituted by a pair of projections each being projected from one side wall of said insulating portion, said shaft being rotatably seated on the tops of said adjacent parallel spaced walls, said

including portion being further provided at the bottom with a projection, said conductive portion occupying the bottom portion including said bottom projection, whereby, when said actuator is in the first position, said bottom projection is placed between said free ends oppositely disposed of said pair of contacts and said conductive portion bridging said free ends of said contacts, while said actuator is in the second position, said projection is slipped out of the space between said free ends of said contacts and hence the bridging of said conductive portion between said free ends is broken; and

d. a housing for covering an assembly consisting of said base member, said pair of contacts and said actuator, said housing being provided with a plurality of partition walls each having a configuration substantially complementary to each of said parallel spaced walls while having a notch for rotatably holding said shaft of said actuator when said housing fits in with said assembly.

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**3,978,299**

## LIQUID-LEVEL DETECTING DEVICE

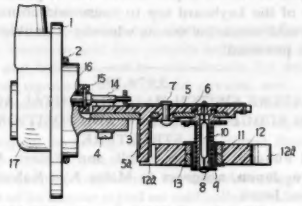
**Norio Takai, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan**

**Filed May 29, 1975, Ser. No. 581,887**

**Claims priority, application Japan, June 7, 1974, 49-66549[U]**

**Int. Cl.² H01H** *35/40*

**U.S. Cl. 200—84 C** **2 Claims**



1. A liquid-level detecting device comprising:
a supporting member,
a float for moving in accordance with liquid-level with respect to said supporting member,
a permanent magnet mounted in said float,
a reed switch fixed to said supporting member and arranged to open and close in accordance with the movement of said permanent magnet thereby to detect the liquid-level, and
a thermoferrite member, provided near said permanent magnet, for cutting an effect of said permanent magnet to said reed switch in a definite temperature range.

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**3,978,300**

## LOW-VOLTAGE CIRCUIT-BREAKER HAVING SMALL CONTACT SEPARATION AND SMALL GAP BETWEEN COOPERATING PARALLEL-ARRANGED ARCING-RAILS

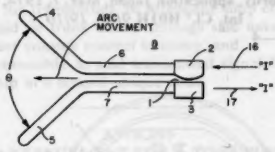
**Paul G. Slade, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Feb. 11, 1975, Ser. No. 533,413**

**Int. Cl.² H01H** *33/02*

**U.S. Cl. 200—147 R** **8 Claims**

1. A low-voltage air-type circuit-breaker adaptable for quickly interrupting low-voltage electrical circuits of the order of 1000 volts or less, the combination comprising, means defining a pair of separable contacts, means for separating said pair of separable contacts only a relatively short distance apart of the order of ¼ inch, or less, a pair of adjoining conducting arcing-rails to which the established arc may be laterally transferred from said pair of separable contacts, said pair of conducting arcing-rails being in generally parallel relationship, and in the open-circuit position being only one-fourth inch apart, or less, and the self-induced magnetic field resulting from the current-flow rapidly moving the established arc




laterally outwardly upon the closely-spaced arcing-rails to facilitate its extinction.

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**3,978,301**

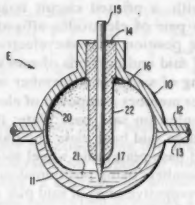
## MERCURY TILT SWITCH

**Sheldon S. Bitko, East Brunswick, N.J., assignor to Fifth Dimension Inc., Princeton, N.J.**

**Filed July 31, 1975, Ser. No. 600,922**

**Int. Cl.² H01H** *29/22*

**U.S. Cl. 200—220** **5 Claims**



1. A mercury tilt switch, consisting of an enclosure having an internal mercury wettable surface, an electrode extending through one wall of said enclosure to a point adjacent to but not touching an inner surface of said enclosure, a quantity of mercury within said enclosure sufficient to wholly coat said internal mercury wettable surface plus enough to form a small pool of said mercury into which said electrode extends while said pool is directly opposed to said electrode and over a predetermined solid angle between said electrode and the surface of said pool, said small pool being positionable by gravity as said enclosure tilts.

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**3,978,302**

## SWITCHING ELEMENT HAVING GOLD-COBALT CONTACTS

**Martinus Antonius Maria Bakker, and Gustaaf Herman Antonius van der Hoorn, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sept. 12, 1974, Ser. No. 505,242**

**Claims priority, application Netherlands, Sept. 21, 1973, 7313022**

**Int. Cl.² H01H** *1/02*

**U.S. Cl. 200—266** **3 Claims**

1. In a switching element having reed contacts in a hermatically closed envelope in which the contact surfaces are clad with a coating consisting of a gold-cobalt alloy having a carbon content of between 0.5 and 1.5% by weight, the improvement wherein the contact surface coating comprises a cobalt content of between 1 and 6% by weight.

3,978,303

## LEAF SPRING SWITCH

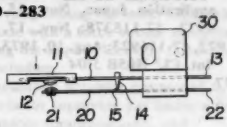
Muneyoshi Miyata, Tokyo, Japan, assignor to Mitsuku Denshi Kogyo K.K., Tokyo, Japan

Filed Oct. 24, 1974, Ser. No. 517,674

Claims priority, application Japan, Oct. 29, 1973, 48-125229[U]; July 2, 1974, 49-78115[U]

Int. Cl.² H01H 1/26

U.S. Cl. 200—283 2 Claims




1. A switch comprising an insulating base member, a first leaf spring having a lug on one longitudinal end, said lug being adapted to be engaged by an actuator, said first leaf spring also having a first contact on said one longitudinal end, said first leaf spring further having a terminal on the other longitudinal end, a second leaf spring having a second contact on one longitudinal end and a terminal at the other longitudinal end, said first and second leaf springs being embedded in said base member in cantilever fashion in a spaced and generally parallel relationship such that said first and second contacts oppose one another in spaced relationship, said lug being adapted to be engaged by said actuator to move said first leaf spring toward said second leaf spring to thereby move said first contact into engagement with said second contact, and an insulating fulcrum member secured to said first leaf spring at a location intermediate said first contact and said base member, said insulating fulcrum member projecting towards said second leaf spring and engaging said second leaf spring at a location intermediate said second contact and said base means to thereby maintain a constant distance between said intermediate locations of said first and second leaf springs, thereby increasing the restitution power of said first leaf spring.

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3,978,304

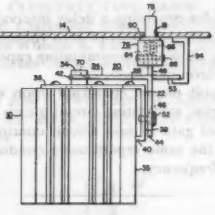
## ENCLOSED CIRCUIT INTERRUPTER INCLUDING EXTERNALLY OPERABLE HANDLE MECHANISM

John G. Salvati, Beaver Falls, and Lawrence B. St. Clair, Beaver, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1974, Ser. No. 531,426

Int. Cl.² H01H 9/02

U.S. Cl. 200—331 6 Claims



1. A control device comprising:

an enclosure having an openable cover, said cover having a handle aperture;

a circuit interrupter disposed within said enclosure and having four sides and a face perpendicular to said sides, said interrupter comprising an actuating lever extending from said face and being movable to actuate said circuit interrupter to "ON" and "OFF" positions; and

an operating mechanism comprising a mounting plate affixed to said circuit interrupter and having a member substantially perpendicular to said face and adjacent one of said sides, a sliding plate movably attached to said perpendicular member and engaging said actuating lever, and a handle structure attached to said sliding plate and having a portion extending through said handle aperture, movement of said extending portion moving said sliding plate and said actuating lever to actuate said circuit interrupter to "ON" and "OFF" positions.

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3,978,305

## MICROWAVE OVEN

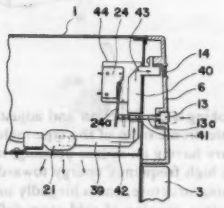
Junzo Tanaka, Fujiidera; Tsuyoshi Takami, Nara, and Chikao Nakano, Yamato Koriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 19, 1975, Ser. No. 579,077

Claims priority, application Japan, Aug. 6, 1974, 49-94313[U]; May 20, 1974, 49-57070

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 E 12 Claims




7. A microwave oven which comprises:

an oven-defining housing structure including an outer casing and an inner casing within and in spaced relation to said outer casing, said inner casing defining therein a heating chamber, said oven-defining housing structure having a hingedly supported door for selectively opening and closing an access opening leading into said heating chamber and an illumination lamp for, when energized, illuminating said heating chamber;

a high frequency wave generator for, when energized, generating microwaves directed into said heating chamber;

a first electrical switch means for, when brought into operative position, completing a power supply circuit for said high frequency wave generator to energize the latter;

a timer device for being set to any desired operating period, said high frequency wave generator being operatively coupled to said timer device and energized during said operation period;

display means for, when illuminated, visually presenting information that said high frequency wave generator is being energized;

light guide means for optically connecting said illumination lamp to said display means for illuminating said display means with a portion of light from said lamp transmitted therethrough; and

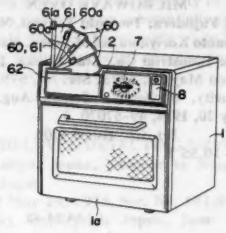
shutter means supported in position to interrupt passage of said portion of light from said lamp towards said display means through said light guide means when said first switch means is not operated, said shutter means being operatively associated with said first switch means such that, when said first switch means is brought into said operative position, said shutter means is held in position to permit said passage of said portion of light towards said display means to illuminate the latter.

3,978,306

## COOKING TIME ADJUSTING ARRANGEMENT FOR USE IN ELECTRONIC OVEN

Fumiko Mori, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 346,795, April 2, 1973, Pat. No. 3,848,105. This application Apr. 17, 1974, Ser. No. 461,785
Claims priority, application Japan, May 6, 1972, 47-41112[U]; May 6, 1972, 47-41113[U]
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 B 1 Claim




1. A cooking time selection and adjusting arrangement for use in an electronic oven of the type including an oven-defining structure having an access opening, means positioned for generating high frequency energy toward the interior of said oven-defining structure, and a hingedly supported door covering said access opening of said oven-defining structure, said time selection and adjusting arrangement comprising:

an instrument panel mounted on said oven-defining structure, said instrument panel having in the front thereof an open-topped recess;

a housing detachably positioned within said recess, said housing and said instrument panel defining an open-topped chamber;

a plurality of cooking cards having substantially a rectangular configuration, each of said cards having thereon data relating to cooking menus and cooking times corresponding thereto and an opening therein;

means for pivotally mounting said plurality of cards adjacent an end of each thereof within said chamber, said cards being individually pivotable from a first position within said chamber to a second upright position whereat a majority of a selected card is without said chamber and in which data on such selected card is visible to an operator of said oven, said card mounting means including a single substantially cylindrical projection integral with said housing and extending outwardly therefrom towards said instrument panel, said single cylindrical projection extending through said openings of each of said cards, a plurality of projections extending outwardly from the outer surface of said single cylindrical projection and into contact with each of said cards, and spring means mounted in said housing and engaging said cards for locking said cards in said upright position;

a timer device mounted in said instrument panel and having an operating shaft extending through said instrument panel; and

said timer device being operatively coupled to said means for generating high frequency energy;

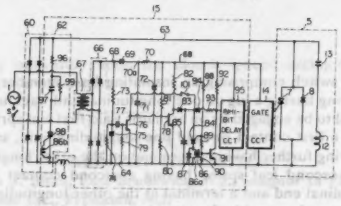
whereby an operator may move a selected cooking card to the upright position thereof to determine a cooking time relating to a menu thereon, and thereafter set said timer device to such cooking time, whereby operation and stopping of said timer device start and stop said means for generating high frequency energy.

3,978,307

## INDUCTION HEATING APPARATUS WITH PROTECTIVE CIRCUIT ARRANGEMENT

Keizo Amagami; Takao Kobayashi; Yoshio Ogino, and Mitsuyuki Kiuchi, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 415,542, Nov. 14, 1973, abandoned. This application July 15, 1975, Ser. No. 596,203
Claims priority, application Japan, Nov. 15, 1972, 47-114990; Nov. 16, 1972, 47-115378; Nov. 17, 1972, 47-115809; Nov. 20, 1972, 47-116923; Aug. 10, 1973, 48-90804
Int. Cl.² H05B 5/04
U.S. Cl. 219—10.77 4 Claims




1. An induction heating apparatus comprising, in combination:

a power supply circuit including a rectifier coupled to an alternating current power source for generating a full-wave rectified unfiltered unidirectional excitation potential;

an inverter circuit coupled to said rectifier and including an induction heating coil, a commutating capacitor receptive of the excitation potential and connected to said induction heating coil, a silicon controlled rectifier having a control electrode, and a diode connected in inverse parallel relationship therewith to drive said induction heating coil with periodic energization current;

a charge absorbing circuit including a charge absorbing capacitor and a semiconductive switching device for providing a conductive path, when energized, between said commutating capacitor and said charge absorbing capacitor so that a charge stored in said commutating capacitor can be discharged through said conductive path to said charge absorbing capacitor;

a circuit for timing energization of said charge absorbing circuit at a zero voltage point of the alternating current voltage of said power source by counting number of zero voltage points from that instant said power circuit is energized;

delay means for providing a delay interval from an instant a predetermined number of zero voltage points has been counted to allow said commutating capacitor to recharge to a predetermined level; and

a gating circuit means energized upon expiration of the delay interval, said gating circuit means being coupled to said control gate of said silicon controlled rectifier for rendering the same repetitiously conductive at a predetermined frequency.

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3,978,308

## WELDING MACHINE

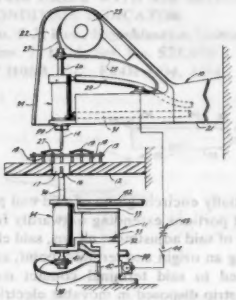
Bill L. Hamby, Newhall, Calif., assignor to Sterling Electronics Corporation, Houston, Tex.

Division of Ser. No. 171,095, Aug. 12, 1971, Pat. No. 3,860,782. This application Jan. 13, 1975, Ser. No. 540,560
Int. Cl.² B23K 11/10
U.S. Cl. 219—89 9 Claims

1. A welding apparatus comprising:

a. a movable upper electrode,

b. a movable lower electrode aligned with the upper electrode,
c. means for supporting a work piece between the upper and lower electrodes,
d. means for applying a wire between the upper electrode and a workpiece,
e. means for pressing the upper electrode toward the lower electrode,
f. means for pressing the lower electrode toward the upper electrode with a force substantially the same as the force pressing the upper electrode toward the lower electrode, and including
i. a pneumatic actuator connected to each electrode,
ii. means for supplying gas under a first pressure to both actuators simultaneously, and



iii. means for supplying gas under a second pressure to both actuators simultaneously sequentially after applying the first pressure, the two means for supply gas comprising a first pressure regulator for supplying gas at a relatively high pressure, a second pressure regulator for supplying gas at a relatively lower pressure, valve means for connecting the first and second regulators to the actuators, and means for operating the valve means for first connecting the first regulator and sequentially thereafter connecting the second regulator, and
g. means for applying electric welding power between the electrodes sequentially after application of the relatively higher pressure.

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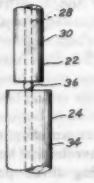
**3,978,309**

## SACRIFICIAL, SHAPED ANODE AND METHOD OF CONSTRUCTING SAME

**Carl G. Strobach, Clarendon Hills; Paul G. Daugirda, Evergreen Park, and William E. Fahey, Palos Heights, all of Ill., assignors to Rheem Manufacturing Company, New York, N.Y.**

**Filed Jan. 8, 1975, Ser. No. 539,395**
**Int. Cl.² B23K 11/02; C23F 13/00**
**U.S. Cl. 219—104** **5 Claims**




1. An improved method for manufacture of an anode of the type having a variable mass per unit length of anode material comprising the steps of:
a. providing a first anode section comprising an exposed center core wire and a surrounding jacket of anode material;
b. providing a second anode section comprising an exposed center core wire and a surrounding jacket of anode material, said first anode section having a mass per unit length distinct from the mass per unit length of said second anode section;
c. contacting at least the exposed center core wires of the separate anode sections; and
d. welding the contacted core wires to provide a unitary continuous core wire and an anode member comprised of a plurality of anode sections.

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**3,978,310**

## MACHINE FOR REPAIR OF CRANKSHAFTS BY WELDING

**William R. Gleason, 33541 Atlantic Ave., Laguna Niguel, Calif. 92677**

**Filed Mar. 10, 1975, Ser. No. 556,913**
**Int. Cl.² B23K 9/12**
**U.S. Cl. 219—124** **5 Claims**

1. In a welding machine for feeding and fusing a bead of molten arc weld metal to and around crankpins and journals of automotive crankshafts, said crankshafts having journals whose centers are on its longitudinal axis and crankpins offset from said longitudinal axis by center-to-center offset distances which differ with different crankshafts, the combination of:
a stationary frame;
a rotatable power driven drive shaft journalled in said frame;
means for supporting the crankshaft for rotation on its longitudinal axis and for coupling it to said drive shaft to rotate synchronously therewith, whereby its crank pins describe orbital paths, and its journals turn concentrically about the longitudinal crankshaft axis;
an electric arc welding torch embodying a welding wire feed nozzle terminating in an outlet tip;
a motion constraining means oscillatory on and laterally to said stationary frame,
an oscillatory motion transmitting means reciprocable on said oscillatory motion constraining means in a direction generally transverse to the direction of lateral oscillation of said motion constraining means,
a crank arm rotatable with said drive shaft and pivotally connected to said oscillatory motion transmitting means,
a carriage for said torch supported on said motion transmitting means and progressively movable thereon in a direction parallel with the longitudinal axis of a crankshaft supported by said crankshaft supporting means, to align the tip of said torch with a selected crank pin or journal of said crankshaft,
a torch support arm on said carriage for adjustably positioning and holding said torch with the nozzle tip thereof selectively in wire feeding and arcing proximity to a selected crank pin or journal of said crankshaft, and
means for adjusting the effective length of said crank arm in a range of lengths, including zero length, whereby the

nozzle tip of said torch describes an orbital path of adjusted radius to maintain its wire feeding and arcing proximity to the selected crank pin throughout the orbital travel of the latter about said longitudinal axis, or, with the crank arm adjusted to zero length, to a selected crankshaft journal.

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3,978,311

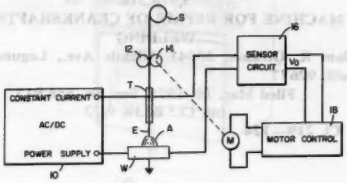
## VOLTAGE SENSOR CIRCUIT FOR AN ARC WELDING WIRE FEED CONTROL

Tibor Endre Toth, Florence, S.C., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 26, 1974, Ser. No. 454,841

Int. Cl.² B23K 9/12

U.S. Cl. 219—131 F 3 Claims




1. A wire feed control for regulating the speed at which a consumable electrode is fed into an arc established between said electrode and a workpiece from a source of constant welding current in response to variations in the arc voltage, comprising: an electrode feed motor, electrode feed means engaging said electrode and responsive to said motor, a motor governor for controllably energizing said motor and a sensor circuit, said circuit comprising, in combination, means for rectifying said arc voltage; an oscillator; means for varying the oscillator frequency in response to changes in the magnitude of said rectified arc voltage; means electrically coupled to said oscillator for emitting pulses of light at a rate proportional to said oscillator frequency; means for detecting said light pulses and an integrating network coupled to said detecting means and comprising a resistor and capacitor in series, the arrangement being such that any variation in the rate of detected light pulses from a predetermined value causes an inversely proportional change in the voltage level across said capacitor to thereby produce a varying DC output signal which is proportional to said voltage change and which is applied to said motor governor in order to vary the wire feed rate in response to variations in said arc voltage.

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3,978,312

## VARIABLE TEMPERATURE ELECTRIC CAUTERY ASSEMBLY

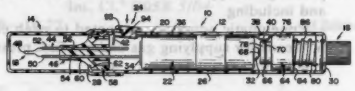
Steve Barton, St. Petersburg; John Glorioso, Clearwater, and Carl L. Foltz, Holiday, all of Fla., assignors to Concept, Inc., Fla.

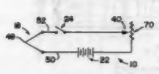
Filed Oct. 17, 1974, Ser. No. 515,526

Int. Cl.² H05B 1/00; H01C 10/26; A61B 17/38

U.S. Cl. 219—240 10 Claims

1. A variable cautery assembly of the type utilizing a voltage source, said cautery assembly comprising a housing, said voltage source contained within said housing, applicator means connected to said housing and having a first terminal means electrically connected to one terminal of said voltage source, a first conductor means disposed within said housing, an actuator means movably attached to said housing, said actuator means movable between a first and second position, said actuator means disposed to engage one end of said first conductor means when in one of said first or second positions such that said one end of said first conductor means movably engages the other terminal means of said applicator means to electrically connect said applicator means in circuit with said voltage source, adjustment means mounted for rotation in said housing; said adjustment means including an enlarged cylindrical base portion having oppositely disposed smaller diameter cylindrical end portions extending outwardly therefrom; second conductor means mounted upon said adjustment means; and said second conductor means comprising terminal contact means disposed in rotatable electrical contact with the other terminal of voltage source, said second conductor means further including electrical resistor strip mounted on





and partially encircling one of said end portions, the other of said end portions extending outwardly from said housing for rotation of said adjustment means, said electrical resistor strip including an origin and terminal point, said origin electrically connected to said terminal contact means, said electrical resistor strip disposed in movable electrical engagement with the other end of said first conductor means whereby the voltage applied to said applicator means is determined by rotating said adjustment means to change the positional relationship of said electrical resistor strip to said first conductor means.

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3,978,313

## POWER REGULATING ARRANGEMENT FOR A THREE PHASE ELECTRODE-TYPE WATER HEATER

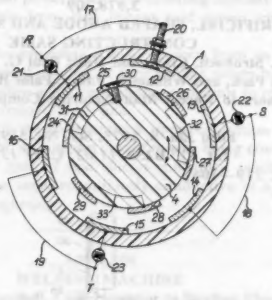
Albert Curchod, Chemin des Roches, 1803 Chardonne, Switzerland, and Aime Luporini, Le Vergeron, 83420 La Croix Valmer, France

Filed Feb. 28, 1975, Ser. No. 554,028

Claims priority, application Switzerland, Mar. 5, 1974, 3124/74

Int. Cl.² H05B 3/60; H01C 10/02

U.S. Cl. 219—285 7 Claims



1. A water heater comprising, means defining a chamber for containing water therein for heating, a first set of heating electrodes comprising three pairs of equidistantly spaced electrodes in fixed spaced relationship to each other and electrically connected in pairs, connections connecting each pair of said first set of electrodes to a respective phase of a

regulatable three-phase current source externally of said chamber, a second set of heating electrodes comprising three pairs of equidistantly spaced electrodes in said chamber in fixed spaced relationship to each other inwardly from the first set of electrodes, conductors electrically connecting the second set of electrodes exclusively in pairs, said chamber containing water in operation providing conductive paths so that the sets of heating electrodes are connected in a delta configuration with said water defining resistive electrical paths, and means to move the one set of heating electrodes relatively to the other set of heating electrodes to change the distance therebetween thereby to vary the length of said electrical paths.

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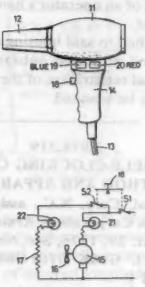
## 3,978,314
## ELECTRIC HAIR DRIER WITH AIR BLOWING CONDITION INDICATOR

Nobuzo Shimizu, No. 5-3, Hon, Higashiosaka, Osaka, Japan

Filed Nov. 7, 1974, Ser. No. 521,689
Int. Cl.² H05B *1/02*; F24H *3/04*, *1/04*
U.S. Cl. 219—361 1 Claim




1. A hair dryer comprising in combination
a. a hollow cylindrical main body;
b. a cylindrical heater sleeve longitudinally coupled to said main body;
c. an extended grip handle normal to said main body and said sleeve with a plug-in cord at the distal end of said grip handle, a two position switching push-button on said grip handle and first and second windows on said grip handle above the gripping portion thereof so as to be visible when the handle is gripped in the hand; said windows being of different, readily distinguishable colors; and,
d. a circuit in said grip handle and said main body including first and second leads connected to said cord, a frist circuit for feeding room air to said heater sleeve between said first and second leads consisting of a first switch responsive to said push-button first position, a first lamp coupled to said first switch set to light upon closing of said first switch, a motor in said main body, and fan in said main body driven by said motor, said motor being in series with said first switch in said first circuit, a second circuit in series with said first switch and in parallel with said first lamp and said motor, said second circuit consisting of a second switch responsive to said push-button second position, a second lamp coupled to said second switch and a heater in said heater sleeve in series with said second switch in said second circuit,
whereby, when said push-button is pressed to a first position, said first switch is closed to energize said motor to cause said fan to blow room air out of said sleeve, and said first lamp is lit, said one light appearing in said one window, but when said push-button is further pushed to a second position, said heater is energized to heat the blown air and said second lamp is also lit so that a light appears in each of the different colored windows.

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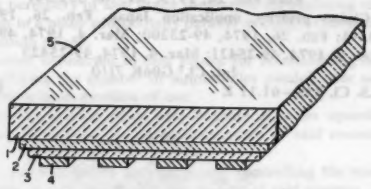
## 3,978,315
## ELECTRICAL HEATING UNITS

Francis W. Martin, Painted Post, and Paul L. Rose, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,798
Int. Cl.² H05B *3/16*
U.S. Cl. 219—543 4 Claims




1. An electrical heating unit comprising:
a. a lithium aluminosilicate glass-ceramic plate;
b. a semicrystalline coating bonded to at least a portion of a surface layer of the glass-ceramic plate, said coating consisting of a crystallized zinc aluminosilicate glass comprising a principal crystal phase of zinc beta quartz;
c. an electrically-insulating barrier layer composed of cordierite bonded to at least a portion of the semicrystalline coating; and
d. an electrical heating element consisting of an electrically conductive noble metal film bonded to the electrically-insulating barrier layer.

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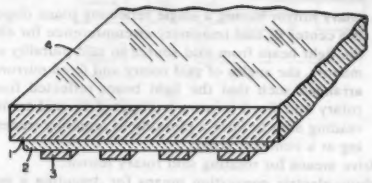
## 3,978,316
## ELECTRICAL HEATING UNIT

Paul L. Rose, Corning; William P. Whitney, Big Flats, and Thomas Williams, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,797
Int. Cl.² H05B *3/16*
U.S. Cl. 219—543 3 Claims




1. An electrical heating unit comprising:
a. a glass-ceramic plate composed of a zinc petalite-beta quartz glass-ceramic material;
b. a protective semicrystalline coating bonded to at least a portion of a surface of the glass-ceramic plate, said coating consisting essentially of a sintered, crystallized zinc aluminosilicate glass, said glass having a composition consisting essentially, in weight percent on the oxide basis, of about 12–25% ZnO, 0–3% MgO, 15–25% total of ZnO + MgO, 15–28% $Al_2O_3$, 50–65% $SiO_2$, 0–1% $K_2O$, 0–5% $Cs_2O$, 0–4% BaO, and at least about 0.5% total of $K_2O + Cs_2O + BaO$; and
c. an electrical heating element consisting of an electrically conductive film bonded to said protective semicrystalline coating, said film consisting essentially in weight percent, of about 90–100% total of noble metals selected from the

group consisting of gold, platinum, rhodium and alloys and mixtures thereof, and 0–10% total of thermally crystallizable glass.

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3,978,317

## OPTICAL BAR CODE READER

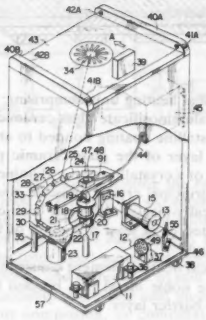
Tetsuo Yamaguchi; Toshihide Hane, both of Yokohama; Seishi Sasaki, Hirakata; Shinzi Inoue, Yokohama; Shigemitsu Fukuyama, Yokohama, and Kazunobu Tsutsumi, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 24, 1975, Ser. No. 552,347

Claims priority, application Japan, Feb. 26, 1974, 49-23191; Feb. 26, 1974, 49-23200; Mar. 4, 1974, 49-25419; Mar. 4, 1974, 49-25421; Mar. 4, 1974, 49-25423

Int. Cl.² G06K 7/10

U.S. Cl. 235—61.11 E 8 Claims



1. Apparatus for optically reading coded information on goods regardless of the orientation of the coded information, comprising:

a light source for emitting a light beam;

a transparent reading area over which goods carrying coded information pass;

a plurality of fixed rectangular mirrors having their longitudinal axes disposed approximately on an imaginary circumference;

a rotary mirror having a single reflecting plane disposed at the center of said imaginary circumference for directing the light beam from said source to said plurality of fixed mirrors, the angles of said rotary and fixed mirrors being arranged such that the light beam reflected from said rotary and fixed mirrors is directed to said transparent reading area to form a plurality of scanning traces crossing at a common point;

drive means for rotating said rotary mirror;

photo-electric converting means for detecting a reflected image of said coded information and generating an electric signal corresponding to said coded information; and

decoder means coupled to said photo-electric converting means for decoding said coded information from said electrical signal.

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3,978,318

## HAND-OPERATED SCANNER

Frank Candilora Romeo, Marlboro, and John Warren Carroll, III, Pepperell, both of Mass., assignors to Data General Corporation, Southboro, Mass.

Continuation of Ser. No. 452,474, March 18, 1974, abandoned. This application Nov. 26, 1975, Ser. No. 635,551

Int. Cl.² G06K 7/10

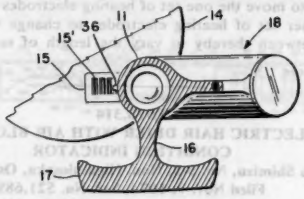
U.S. Cl. 235—61.11 E 8 Claims

1. A hand-operated scanner for scanning a printed data bearing medium by photo-optical means comprising:

housing means provided with a reading aperture end adapted to be placed contiguous with and moved over, the data bearing medium;

illumination means mounted in said housing means to provide for illumination at the reading aperture;

photosensitive means mounted on said housing and adapted to receive through said reading aperture, reflected illumination from the data to be read;



holding means extending from said housing including an inverted T shaped configuration for receiving at least two adjacent fingers of an operator's hand for manipulation of the scanner; and,

guide means attached to said housing means at said reading aperture end and projected outwardly to allow a visual check for manual registration of the reading aperture end with the data to be scanned.

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3,978,319

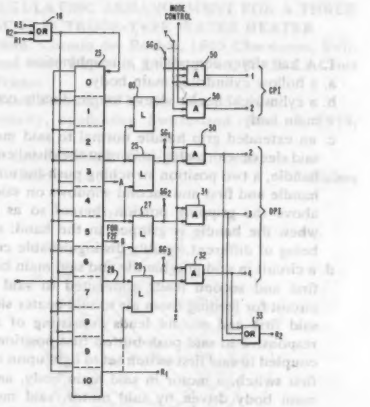
## UNIVERSAL SELF-CLOCKING CODE READING METHOD AND APPARATUS

Albert Watson Vinal, Cary, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 29, 1975, Ser. No. 626,680

Int. Cl.² G06K 7/10; G08C 9/06

U.S. Cl. 235—61.11 E 23 Claims



1. A method of decoding the encoded informational contents of a series of separately spaced apart, machine-dectectable, electrically manifested signals of first and second machine-identifiable types, said series of signals being encoded in accordance with any self-clocking encoding scheme whose elemental physical and informational characteristics have been provided to a decoder apparatus, said method comprising steps performed by said apparatus, when said series of signals is connected thereto, of:

a. detecting a signal of either of said types;

b. segmenting the time subsequent to the last said detected signal into separate and identifiable segments, each seg-

ment being of controlled length and being located, relative to said last detected signal, to span only one valid potential location of another of said signals;

c. detecting, within different ones of said separate and identifiable segments, one each of said first and second types of signals; and

d. decoding the encoded information contents of the portion of said series of signals bounded by said last two detected signals of like type by controlling a selection of informational contents from among said provided characteristics, said controlling being performed in response to the identifications of said identifiable segments within which said last two detected signals were detected; and

e. repeating the process from step (b) until all of said series of signals has been decoded.

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**3,978,320**

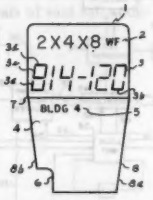
**DATA CONTROL DEVICES**

**W. Neil McBride, Jr., P.O. Box 371, Conneautville, Pa. 16406**

**Filed Feb. 20, 1975, Ser. No. 550,012**

**Int. Cl.² G06K** *19/04, 19/06;* **G11B** *25/04*

**U.S. Cl. 235—61.12 M** **9 Claims**




1. A portable document used to improve the speed and accuracy of data capture when presented to a reading device, comprising a plasticized generally rectangular support means provided with a pair of tapered longitudinally extending edge portions and a first pair of transversely extending edge portions, said edge portions defining therebetween more than one indicia receiving means and at least one indicia displaying means, wherein said indicia receiving means include a magnetic track and a persistent electrochromic display portion, and said display means include the same beforein mentioned persistent electrochromic display portion.

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**3,978,321**

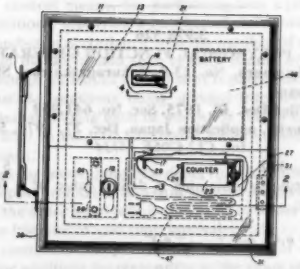
**PORTABLE HAND-CARRIED AUTOMOBILE COUNTING DEVICE**

**Robert E. Doggett, 22003 Chaparral Lane, Castro Valley, Calif. 94546**

**Filed Aug. 22, 1974, Ser. No. 499,478**

**Int. Cl.² H03K** *21/32*

**U.S. Cl. 235—92 TC** **1 Claim**




1. An automobile counting device comprising:

a portable, manually carried, thin flat housing having a car-counting position of use laid flat-wise on a driveway traversed by automobiles to be counted with the major dimension of said housing substantially parallel to the ground, and a second, upended, non-counting, carrying position with said major dimension substantially perpendicular to the ground, said housing being dimensioned to lie in counting position within the span of the wheel track and within the ground clearance of automobiles to be counted;

electric means carried by said housing for sensing the passage of an automobile thereover and including an electromagnetic radiating loop carried by said housing adjacent the periphery of said major dimension for disposing said loop in a plane substantially parallel to the ground in said position of use;

a counter connected to said means for accumulating and displaying the number of automobiles passing over said housing in its position of use;

means functioning when said housing is in its upended carrying position to prevent operation of said counter; and

supervisor-controlled locking means controlling the energizing of said circuit and the reading of said counter.

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**3,978,322**

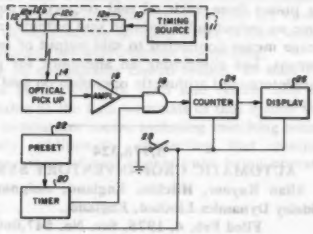
**MEASUREMENT SYSTEM FOR TIMER**

**Robert C. Dobkin, Atherton, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Sept. 30, 1974, Ser. No. 510,619**

**Int. Cl.² G04C** *19/02;* **G01R** *23/06;* **G06F** *7/56*

**U.S. Cl. 235—92 T** **14 Claims**




1. A system for measuring the accuracy of the timing source of a device having a light emitting display which is formed of a plurality of light emitting elements which are energized successively at a rate derived from the timing cycle of that source, said system comprising

a. transducer means responsive to only one of the light emitting elements for generating a signal having a parameter which is proportional to said rate of the light emission of that element.

b. timing means for generating a signal having its parameter which is proportional to time, and

c. means responsive to said signals for determining the value of one of said parameters which accumulates during a time period which is proportional to the other of said parameter.

3,978,323

## APPARATUS FOR ACHIEVING PREDETERMINED TRANSFER CHARACTERISTICS

**Wolfgang Friedrich Georg Mecklenbrauker; Petrus Josephus van Gerwen; Wilfred André Maria Snijders; Theodoor Antonius Carel Maria Claasen, and Hendrik Arie Van Essen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 7, 1975, Ser. No. 565,390**

**Claims priority, application Netherlands, Apr. 18, 1974, 7405238**

**Int. Cl.² G06F *7/38***

**U.S. Cl. 235—150.52** **27 Claims**

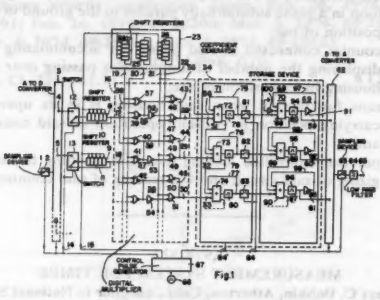


Fig.1

1. An apparatus for producing a predetermined transfer characteristic of information-containing signals, comprising clock means for generating clock pulses, input means for supplying said information-containing signals; coefficient generator means for supplying a first train of pulses of digital multiplication coefficients; delay means, connected to said input means, for supplying a second train of pulses of representations of said information-containing signals in successive time periods digital multiplier means; having a first input connected to said coefficient generator, a second input connected to said delay means and an output for digitally multiplying pulses from each of said respective pulse trains to produce an output pulse train on said output; and

storage means connected to said output of said multiplier means, and comprising an alternator for performing a predetermined arithmetic operation on said output pulse train.

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3,978,324

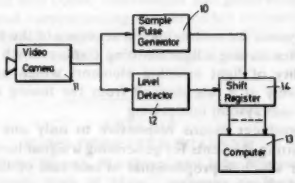
## AUTOMATIC CROP INVENTORY SYSTEM

**John Allan Rayner, Hitchin, England, assignor to Hawker Siddeley Dynamics Limited, England**

**Filed Feb. 4, 1975, Ser. No. 547,060**

**Int. Cl.² H04N *7/02*; G06G *7/48***

**U.S. Cl. 235—151.3** **6 Claims**




1. Apparatus for use in the automatic inventory of crops, comprising an airborne television camera for viewing the area under surveillance from the air and deriving, by scanning, a video signal whose amplitude constitutes an analogue of the reflectance of the succession of points being scanned, a level detector which produces an output signal when said analogue video signal exceeds a predetermined threshold level, a shift register receiving the output signals of the level detector as a series binary digital information train and making the information available as a parallel binary output, a sample pulse generator which is synchronized to the video signal and the output of which clocks the information from the level detector into the shift register, and a computer which accepts a complete frame of video information from the shift register parallel output.

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3,978,325

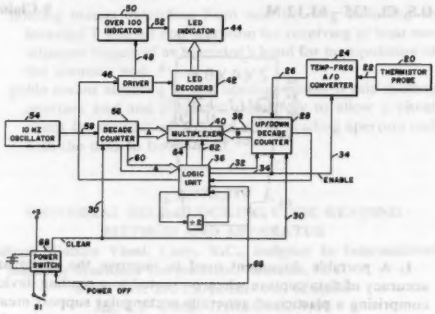
## ELECTRONIC THERMOMETER

**Harold Goldstein, Westbury, and William Montren, Bay Shore, both of N.Y., assignors to Control Electronics Co., Inc., Farmingdale, N.Y.**

**Filed Sept. 5, 1973, Ser. No. 392,961**

**Int. Cl.² G01V *1/28*; G01K *7/02***

**U.S. Cl. 235—151.3** **15 Claims**




1. Electronic apparatus to measure temperature comprising:

means for varying an electrical parameter representing the temperature being measured in accordance with a known delayed response, wherein said electrical parameter reaches a steady state value, said value being representative of a final temperature,

means electrically connected to said parameter varying means for converting said electrical parameter to an alternating current signal during both a first and a second time period, the lengths of said time periods each being shorter than the time period required for said electrical parameter to reach said steady state value, and

means for computing said final temperature by operating upon said alternating current signal converted during said first time period and said alternating current signal converted during said second time period before said electrical parameter reaches said steady state value.

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3,978,326

## DIGITAL POLYNOMIAL FUNCTION GENERATOR

**Naonobu Shimomura, No. 13-8, Sakuragaoka-cho, Shibuya, Tokyo, Japan**

**Filed Dec. 18, 1975, Ser. No. 641,950**

**Claims priority, application Japan, Dec. 27, 1974, 50-655**

**Int. Cl.² G06F *15/34***

**U.S. Cl. 235—152** **5 Claims**

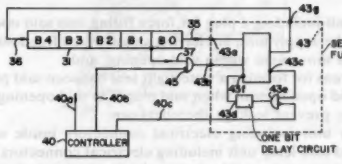
1. Apparatus for obtaining a digital value of a function expressed by:

$$w = a_0 + a_1x + a_2x^2 + \ldots + a_nx^n$$

where

$w$ is the function the value of which is to be obtained,

$a_0, a_1, a_2, \ldots, a_n$ are constants,
$x$ is the independent variable,
$n$ is an integer and $n \geqq 2$,
comprising:
a shift register means composed of blocks B0, B1, B2, . . . , B$n$ having equal bit lengths of storage and arranged in the order of B0, B1, B2, . . . , B$n$ and having first and second output terminals and an input terminal, means for loading each block of said shift register means with respective specific numerical value determined by the constants $a_0, a_1, a_2, \ldots, a_n$,
control means for supplying shift pulses to said shift register blocks to shift the contents of said blocks of said shift register means,
means for reading out serially the contents of said shift register means in response to said shift pulses in the order of B0, B1, B2, . . . , B$n$ from said first output terminal, and, simultaneously, in the order of B1, B2, . . . , B$n$ from said second output terminal of said shift register means,
a serial full adder means having two input terminals and one output terminal,
means for supplying said read out digits from said first output terminal of said shift register means to one of the input terminals of said full adder means,



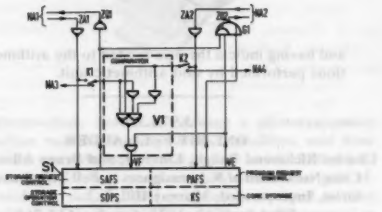

means for supplying said read out digits from said second output terminal of said shift register means to the other of the input terminals of said full adder means,
means for supplying the digits from said output terminal of said full adder means to said input terminal of said shift register means to be rewritten therein,
said control means, for performing one cycle of cascade additions, supplying a number of shift pulses selected in number in accordance with the number of storage bits of said blocks of said shift register means to shift the bits through all blocks of said shift register, said one cycle of cascade additions being divided into $n+1$ equal time intervals during each of which the bits of each block are shifted to the next successive block in said shift register means,
means for interrupting the digits read out from said second output terminal of said shift register means to be supplied to the other input terminal of said full adder means during the last one of said time intervals, and
said control means performing a number of cycles of cascade additions corresponding to the value of the independent variable $x$, thereby to obtain the value of the function $w$ in the block B0 of said shift register means.

## 3,978,327

## PROGRAM-CONTROLLED DATA PROCESSOR HAVING TWO SIMULTANEOUSLY OPERATING IDENTICAL SYSTEM UNITS

**Josef Huber, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Continuation of Ser. No. 336,706, Feb. 28, 1973, abandoned.**
**This application Jan. 23, 1975, Ser. No. 543,647**
**Claims priority, application Germany, Mar. 13, 1972, 2212069**
**Int. Cl.[2] G06F** *11/08, 15/16*
**U.S. Cl. 235—153 AE** **1 Claim**




1. In program-controlled data processing apparatus wherein central processing system units are in communication with central storage system units, at least two identically constructed processing units having data terminals thereon connected to operate in a parallel manner with the data terminals of at least two identically constructed central storage units, and at least two identically constructed central storage units having data terminals thereon connected to operate in a parallel manner with the data terminals of at least two of said identically constructed processing units, such that the respective system units perform identical functions concurrently and in synchronism and wherein bits of information supplied by those of said system units operating in parallel are compared and in case of malfunction or disturbance a fault indicating signal is produced, the improvement comprising:
a plurality of comparator circuit means, at least one of which is associated with each said system unit and is connectable to the data terminals of that system unit,
each said comparator means including switching means for selectively additionally connecting that comparator means to others of said system units being operated in parallel.

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## 3,978,328

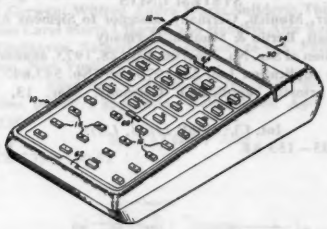
## POCKET CALCULATOR

**William F. Fabry, Sunnyvale, and Dennis C. Hersley, Cupertino, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Apr. 7, 1975, Ser. No. 565,807**
**Int. Cl.[2] G06F** *7/38*
**U.S. Cl. 235—156** **6 Claims**

1. An A portable hand held calculator comprising
a. a main frame including
1. a first circuit board,
2. a keyboard coupled to said first circuit board,
3. a display coupled to said first circuit board, and
4. a case for housing and supporting said first circuit board, said keyboard, and said display;
b. a module including at least an arithmetic unit for receiving information from said keyboard, processing said keyboard information, and supplying information to said display;
c. means for releasably attaching and electrically connect-

ing said module to said main frame; and
d. a template disposed for being received on said keyboard



and having indicia thereon related to the arithmetic functions performed by said arithmetic unit.

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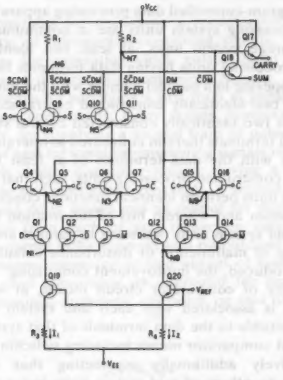
**3,978,329**
**ONE-BIT FULL ADDER**
**Charles Richmond Baugh, Lincroft, and Bruce Allen Wooley, Colts Neck, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**
**Filed Sept. 12, 1975, Ser. No. 612,760**
**Int. Cl.² G06F 7/50**
**U.S. Cl. 235—176** **9 Claims**



1. Apparatus performing sum and carry output signals in response to applied first and second summand input signals, a carry input signal and complements of said input signals comprising

first and second current sources for generating substantially constant currents $I_1$ and $I_2$, respectively,

first and second tree arrays each having a base node, a plurality of terminal nodes, and a hierarchy of levels of interconnected switches, the lowest level being adjacent said base node, each path connecting said base node to a terminal node including a plurality of switches, each of said plurality of switches being responsive to a unique combination of said summand and carry input signals,

means connecting said first current source to the base node of said first tree array,

means connecting said second current source to the base node of said second tree array, and

output means for generating said sum and carry output signals in response to the selection of paths between said base nodes in said first and second tree arrays and respective terminal nodes in said first and second tree arrays in response to a particular pattern of said input signals, at least a first pair of said paths including different ones of said switches in one level and sharing a common switch in a higher level.

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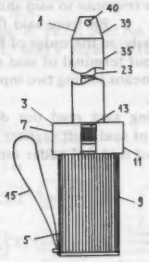
**3,978,330**
**BATTERY HAND LAMP**
**Paul Peter Maurer, Luzernerstrasse 27, CH-8903 Birmensdorf, Switzerland**
**Filed Sept. 11, 1974, Ser. No. 504,895**
**Claims priority, application Switzerland, Sept. 17, 1973, 13327/73**
**Int. Cl.² F21L 11/00**
**U.S. Cl. 240—10.6 R** **4 Claims**



1. A battery hand lamp comprising:

a supply unit defining an opening therein with an opening wall;

a lamp unit including a plug for force fitting into said opening in the supply unit, but having an unlimited freedom of angular movement within said opening; and

a seal means for forming a watertight seal between said plug and said opening wall when said plug is in said opening to thereby prevent leakage therebetween;

said supply unit including electrical connectors inside said opening and said lamp unit including electrical connectors on said plug for contacting said supply-unit electrical connectors, to conduct electrical energy from said supply unit to said lamp unit, ones of said electrical connectors having the form of rings and the other being slide contacts for contacting said rings and permitting the mounting of the lamp unit in the supply unit in different angular positions, while providing electrical contact between said electrical connectors in any of said angular positions;

said lamp unit further comprising a fluorescent tube in electrical contact with said connectors and a transparent protection tube for containing said fluorescent tube and a metallic reflector located in the protection tube, said reflector serving as an electric conductor between one contact and the fluorescent tube.

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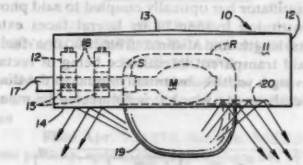
**3,978,331**
**AREA LIGHTING LUMINAIRE**
**Nicholas J. Paparodis, Youngstown, Ohio, assignor to The Edward J. DeBartolo Corporation, Youngstown, Ohio**
**Filed Apr. 14, 1975, Ser. No. 568,065**
**Int. Cl.² F21S 1/10**
**U.S. Cl. 240—25** **7 Claims**

1. An area lighting luminaire comprising an enlarged housing with closed side, end and top walls and a bottom wall having an aperture therein spaced with respect to the peripheral edges thereof, a light source and a reflector therefor in said housing and a refractor located in said aperture in said bottom wall and depending therefrom, at least one substantially flat reflective area formed in said bottom wall between the peripheral edge thereof and the refractor and arranged to

redirect light from said refractor outwardly and downwardly with respect to the same and means in said housing supporting



said light source and mounting said housing on an elevated support.

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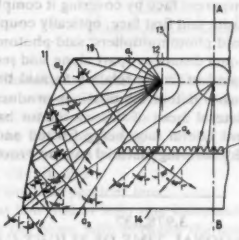
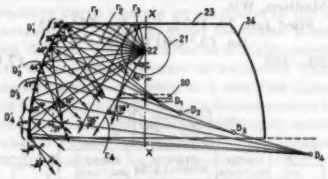
**3,978,332**

## LIGHTING APPARATUS WITH BATWING LIGHT DISTRIBUTION

**Ignacio Goytisolo Taltavull, Calle Madrazo, 83, Barcelona, Spain**

**Filed July 14, 1975, Ser. No. 595,424**
**Int. Cl.² F21V 7/00**
**U.S. Cl. 240—51.11 R** **11 Claims**





1. A lighting apparatus with batwing light distribution comprising a housing with a reflecting inner surface, a lighting source in the housing and a prismatic refracting device beneath the lighting source, said housing having a lateral surface with a profile composed of several circular arcs with different radii and centers, and said prismatic refracting device, which has slightly larger dimensions than the area of said light source, comprises in a transparent plate having a lower face formed by a plane surface and an upper face formed by a plurality of triangular prisms contiguous with each other, the free salient angles of said prisms being truncated and replaced by rectangular prismatic portions of low height, the free face of each of which has a surface capable of intercepting luminous rays which strike them.

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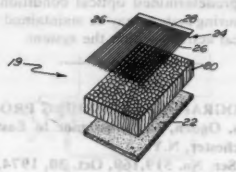
**3,978,333**

## PHOTOVOLTAIC DEVICE HAVING POLYCRYSTALLINE BASE

**Everett Crisman, 8 East St., Providence, R.I. 02907, and William F. Armitage, Jr., 5 Baron Park Lane, Apt. 37, Burlington, Mass. 01803**

**Filed Apr. 15, 1974, Ser. No. 461,165**
**Int. Cl.² H01J 39/12**
**U.S. Cl. 250—211 J** **9 Claims**



1. A photovoltaic device comprising a photoresponsive polycrystalline base having individual crystallites, said base having at least one substantially flat surface to which illumination is to be applied, and an electrically conductive grid affixed to said flat surface, said grid being arranged so that substantially all of the individual crystallites are contacted at least once by said grid, said grid being constructed of a material that will effect a rectifying junction with said base, said base having ohmic electrical contact means affixed thereto at a point spaced from said grid.

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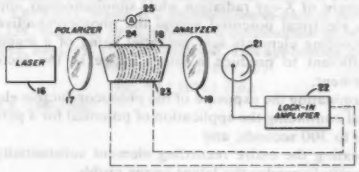
**3,978,334**

## PRECISION LASER BEAM DEFLECTION DETECTOR

**Peter D. McCardell, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 24, 1975, Ser. No. 616,237**
**Int. Cl.² G02F 1/01; H01J 39/12**
**U.S. Cl. 250—225** **11 Claims**




1. In an optical measuring system including a source of coherent light, an electro-optical system for quantitively determining deflection or displacement of the light output from said source of coherent light and having an optical axis comprising:

polarizer means located on the optical axis of the electro-optical system for establishing an axis of polarization for the source of coherent light;

a Faraday rod having non-parallel entrance and exit faces spaced apart along a longitudinal axis which is located on the optical axis of the electro-optical system to transmit the polarized output from the polarizer means through a predetermined length thereof;

analyzer means located on the optical axis of the electro-optical system and positioned for receiving the light output from said Faraday rod;

electro-optical detector means located on the optical axis of the electro-optical system in operative relation with respect to said analyzer means for intercepting the output therefrom and for generating an electrical analog therefrom;

amplifier means connected to said electro-optic detector means for amplifying the electrical analog output therefrom and for developing a control signal therefrom;

control means operatively connected to said amplifier means for receipt of said control signal therefrom and positioned in operative relation to said Faraday rod for control thereof; and

measuring means indirectly connected to said control means for sensing and displaying the magnitude of the control signal supplied thereto by said amplifier means, whereby a predetermined optical condition within said optical measuring system may be maintained as an indication of optical activity within the system.

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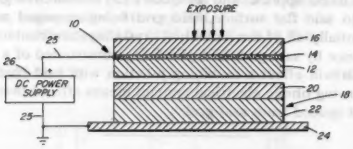
## 3,978,335
## ELECTROGRAPHIC RECORDING PROCESS

**Carl B. Gibbons, Ogden, Utah, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 519,169, Oct. 30, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,814**

**Int. Cl.² G03B 5/17; G03C 5/16; G03G 13/00**

**U.S. Cl. 250—320** **9 Claims**




1. An electrographic recording process comprising the steps of:

a. positioning a persistent conductivity, X-ray sensitive photoconductive element adjacent a charge sensitive recording element containing a reducible metal compound in a binder;

b. exposing the photoconductive element to an imagewise pattern of X-ray radiation while simultaneously applying an electrical potential across the photoconductive and recording elements said potential being of a magnitude sufficient to produce a latent image in the recording element;

c. terminating the exposure of the photoconductive element and continuing the application of potential for a period of up to 300 seconds; and

d. heating the entire recording element substantially uniformly to render the latent image visible.

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## 3,978,336
## HYBRID SCINTILLATION SCANNING APPARATUS

**Georges Roux, Paris, France, assignor to Compagnie Generale de Radiologie, Paris, France**

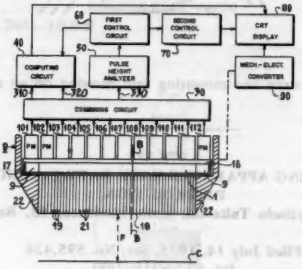
**Filed Jan. 6, 1975, Ser. No. 538,800**

**Claims priority, application France, Jan. 10, 1974, 74.00812**

**Int. Cl.² G01T 1/20**

**U.S. Cl. 250—366** **6 Claims**

1. A hybrid scintillation scanning apparatus for locating radiation emanating from an object and comprising: an elongated scintillation crystal bar for converting the incident radiations into luminous scintillations provided with at least one planar and transparent face, adapted to transmit the light of the scintillations to the exterior of the bar; a collimator located in proximity to and facing one of the lateral faces of the bar for transmitting radiations to the whole of the bar and defining in the region of the object a linear radiation field parallel to the axis of the bar; and a plurality of photomultipliers whose photocathodes are optically coupled to the transparent faces of the bar by means of optical joints and/or light guides; and an electronic computing circuit for locating the scintillations along the bar as a function of the signals delivered by all of said photomultipliers; wherein said transparent face of the scintillator bar optically coupled to said photomultipliers is constituted by one of its lateral faces extending throughout its length and distinct from the one facing the collimator, said transparent lateral face being of rectangular shape and having a width substantially equal to the diameters of said photocathodes to which it is connected by means of a




light guide of elongated shape comprising a first face optically coupled to said transparent face by covering it completely and a second face, opposite said first face, optically coupled to the photocathodes of said photomultipliers, said photomultipliers being disposed at equal distances apart along said second face of the light guides and in facing relation to said transparent face of the bar so as to detect scintillations produced by the bar; all the other lateral faces of the scintillator bar distinct from the transparent lateral face being frosted and covered with a layer of a light-diffusing material so as to prevent reflections therefrom.

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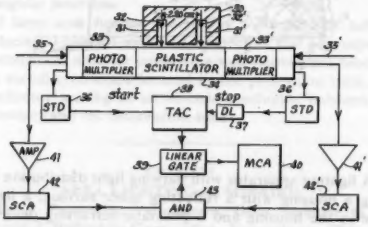
## 3,978,337
## THREE-DIMENSIONAL TIME-OF-FLIGHT GAMMA CAMERA SYSTEM

**Robert J. Nickles, Madison, Wis., and Hans O. Meyer, Basel, Switzerland, assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Jan. 29, 1975, Ser. No. 544,883**

**Int. Cl.² G01T 1/20**

**U.S. Cl. 250—367** **17 Claims**




1. In a positron radionuclide camera system, in combination,

a pair of elongated plastic scintillator bars having a skewed spatial relationship to each other,

the axes of said pair of bars thereby defining a unique tetrahedron in space constituting the camera sensitive volume,

each of said bars having disposed at each end thereof light responsive means for producing respective timing pulses at times ($t_1$), ($t_2$), ($t_3$), and ($t_4$) subsequent to the occur-

rences within said tetrahedron of certain positron annihilations.

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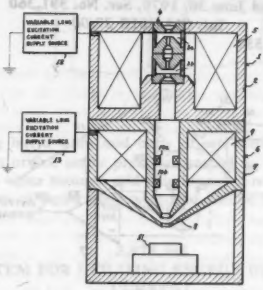
**3,978,338**

## ILLUMINATION SYSTEM IN A SCANNING ELECTRON MICROSCOPE

**Katsuyoshi Ueno, and Hirotami Koike, both of Akishima, Japan, assignors to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 7, 1975, Ser. No. 565,628**
**Claims priority, application Japan, Apr. 16, 1974, 49-42979**
**Int. Cl.² G21K *1/08, 7/00***
**U.S. Cl. 250—396 R** **2 Claims**



1. An illumination system for directing an electron beam from a source to produce a very fine beam diameter spot on a specimen, said system useful in a scanning electron microscope or the like, comprising

a first lens having a plurality of pole gaps in a single magnetic circuit; and

at least one independent lens;

said first lens and at least one independent lens positioned along the beam path between the source and specimen, said first lens being nearer said source than said at least one independent lens;

said first lens and at least one independent lens having in combination an excitation current-beam diameter at specimen curve wherein an excitation of the first lens is increased the beam diameter decreases somewhat and then diverges and thereafter in a highly sensitive mode with a very small increase in excitation current beam diameter decreases rapidly to a very fine diameter and,

means for supplying sufficient excitation current to said first lens to operate said system in the highly sensitive mode such that a small variation in excitation current results in a large variation in beam diameter.

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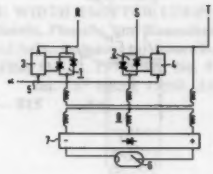
**3,978,339**

## REGULATING INSTALLATION FOR POWER TRANSMITTED TO A THREE-PHASE USER

**Horst Aichinger, Furth, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany**

**Filed Jan. 13, 1975, Ser. No. 540,666**
**Claims priority, application Germany, Jan. 15, 1974, 2401774**
**Int. Cl.² H05G *1/30***
**U.S. Cl. 250—402** **1 Claim**

1. A regulating installation for the controlling power conveyed to a three-phase user, said installation comprising an X-ray diagnostic apparatus having an X-ray tube; a three-phase high-voltage transformer having three primary power windings; switch means transmissive in both current directions having triggering characteristics, respectively one of said switch means being positioned in each of two of the three power supply phases; first and second impulse generators; an element transmitting a control signal to said impulse generators upon the difference in the actual value and a reference value of the X-ray dose produced by said X-ray tube; each of said impulse generators controlling, respectively, one said switch means, said generators each being synchronized with a power supply phase and transmitting a triggering impulse to the respective switch means during the half-wave of its synchronizing power supply phase, the initiation of said triggering impulse within said half-wave being dependent upon said control signal, the improvement comprising: means connecting said first impulse generator to the one of said three transformer phases that does not have one of said switch means connected thereto so as to synchronize said first impulse generator with the phase that is uninterrupted by any of said switch means and means connecting said second impulse generator to the same phase that contains the switch means that are controlled by said second impulse generator so as to synchronize said second impulse generator with the phase containing the switch means that it controls.



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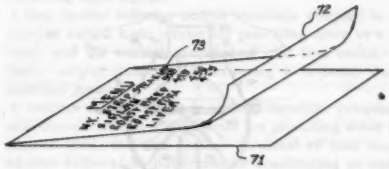
**3,978,340**

## LUMINESCENT BACKING SHEET FOR READING AND WRITING IN THE DARK

**Becky J. Schroeder, 2317 Valleybrook Drive, Toledo, Ohio 43615**

**Continuation-in-part of Ser. No. 498,705, Aug. 19, 1974, Pat. No. 3,879,611, which is a continuation-in-part of Ser. No. 428,339, Dec. 26, 1973, which is a continuation of Ser. No. 288,148, Sept. 11, 1972, abandoned. This application Apr. 11, 1975, Ser. No. 567,397**
**Int. Cl.² H01J *1/62***
**U.S. Cl. 250—462** **6 Claims**




1. A luminescent backing assembly for making intelligible matter visible in darkness comprising;

a backing member having a luminescent glow surface,

an overlay sheet of material through which luminescent glow light can pass overlying said backing surface,

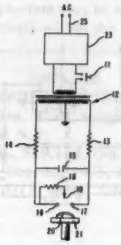
said overlay sheet having intelligible matter thereon comprising contrasting luminescent reading matter of different activated color from said luminescent surface and which in combination with said luminescent surface causes said matter to be silhouetted against said luminescent surface and visibly discernable in the dark.

3,978,341

## SHORT WAVELENGTH ULTRAVIOLET IRRADIATION TREATMENT OF POLYMERIC SURFACES

Paul Clason Hoell, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 10, 1974, Ser. No. 459,709
Int. Cl.² H05B 41/16; C08J 3/28
U.S. Cl. 250—492 R 4 Claims



1. Apparatus for applying ultraviolet radiation having a wavelength in the range of from about 830 A to about 1335 A to the surface of a shaped article prepared from an organic polymer comprising means for supporting said shaped article, first and second electrodes exposed in the atmosphere and spaced from about 1 mm to 9 mm apart and being spaced with respect to said means for supporting a shaped article such that a discharge arc between said electrodes will illuminate a shaped article supported by said means to support a shaped article; a 0.001 $\mu$f to 0.02 $\mu$f capacitor having its conductive surfaces connected with said first and second electrodes; means for charging said capacitor under a voltage of at least 1 kv per mm of spacing between said first and second electrodes.

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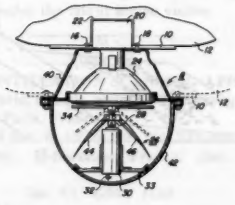
3,978,342

## DUAL MODE RADIATION TRANSMITTING APPARATUS

James M. Hagen, Riverside, and Roger C. Farmer, Glendora, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 7, 1975, Ser. No. 565,513
Int. Cl.² G01J 1/00
U.S. Cl. 250—495 22 Claims



1. Apparatus for transmitting radiation to a remote location comprising:

a stationary source of infrared radiation,

means for energizing said source of radiation,

a motor driven rotary scanning means positioned adjacent said infrared source,

means for selectively driving said rotary scanning means at either a first or second angular velocity, and

an infrared filter operably associated with said rotary scanning means, said infrared filter inhibiting the visible light emanating from said infrared radiation source from being transmitted to a remote location by said rotary scanning means when said rotary scanning means is driven at said first angular velocity and allowing the visible light emanating from said infrared radiation source to be transmitted to said remote location by said rotary scanning means when said rotary scanning means is driven at said second angular velocity.

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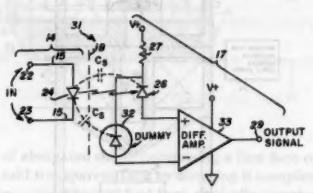
3,978,343

## OPTICALLY COUPLED ISOLATOR CIRCUIT HAVING INCREASED COMMON MODE REJECTION

James L. Broderick, San Jose, and William R. Fowler, Sunnyvale, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed June 30, 1975, Ser. No. 591,360
Int. Cl.² G02B 27/00
U.S. Cl. 250—551 13 Claims




1. The method for increasing the common mode rejection between the input and output of an optically coupled isolator circuit of the type wherein, in a common package, a light emitter means which is responsive to an input signal produces an output optical signal which is coupled through an optically transmissive electrical insulator to a principal photodetector disposed in stray capacitive coupled relation to said light emitter means for detecting the optical signal to produce an output signal in response thereto, the steps of:

coupling a dummy photodetector, which has similar electrical characteristics to said principal photodetector means except being nonresponsive to the output optical signal, in stray capacitive coupled relation to said light emitter means, such stray capacitive coupling being similar in phase and magnitude to the stray capacitive coupling between said principal photodetector and said light emitter, to derive a dummy output electrical signal from said dummy photodetector which is nearly the same as that derived from said first photodetector except for the detected optical signal component in the output of said principal photodetector; and

taking the difference between said dummy output signal and said output signal from said principal photodetector to derive a difference signal output having increased common mode rejection.

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3,978,344

## OSMOSIS PROCESS FOR PRODUCING ENERGY

Hans H. G. Jellinek, May Road, Rte. 2, Potsdam, N.Y. 13676

Filed Nov. 8, 1974, Ser. No. 521,963
Claims priority, application Japan, Nov. 12, 1973, 48-736728
Int. Cl.² F03G 7/06
U.S. Cl. 290—1 R 13 Claims

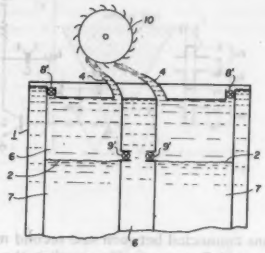
1. A process for generating kinetic mechanical energy from a body of fresh water and a body of salt water comprising

separating bodies of fresh water and salt water with a semipermeable membrane which is in contact with both bodies,

locating an outlet orifice in communication with said body of salt water, said outlet orifice having a predetermined minimum cross-sectional area for maximum power out-

put such that the minimum cross-sectional area equals the influx of fresh water to said salt water divided by the maximum linear flow rate at the orifice,

passing liquid from said body of fresh water through said semipermeable membrane into said body of salt water, and



ejecting liquid from said body of salt water through said outlet orifice under pressure created by passage of said fresh water through said membrane thereby producing a stream of liquid possessing said kinetic mechanical energy.

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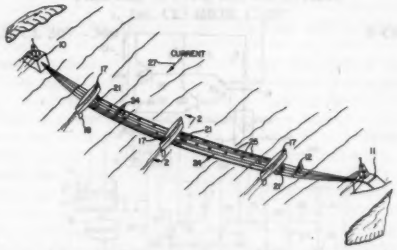
**3,978,345**

## SYSTEM FOR UTILIZING ENERGY IN A FLUID CURRENT

**David Zabriskie Bailey, 214 Bowen St., Providence, R.I. 02906**

**Filed May 24, 1974, Ser. No. 473,240**
**Int. Cl.² F03B** *13/105*
**U.S. Cl. 290—54** **10 Claims**



**1.** An apparatus for utilizing the energy in a fluid stream comprising a pair of anchorage means in fixed positions spaced apart transversely relative to said stream, elongated suspension means spanning said stream transversely of stream flow and having a pair of end portions, each end portion being attached to a said anchorage means, at least one lift foil element attached to said suspension means and being aligned therewith submerged in said stream and thereby extending transversely of said stream flow, and useful power generating means connected with and driven by movement of said lift foil element responsive to forces induced thereon by the moving stream.

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**3,978,346**

## HIGH DC VOLTAGE GENERATOR

**Koji Iwata, Hitachi, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Apr. 7, 1975, Ser. No. 565,374**
**Claims priority, application Japan, Apr. 9, 1974, 49-40303**
**Int. Cl.² H02J** *3/38*; **H02M** *7/17*
**U.S. Cl. 307—51** **6 Claims**

**1.** A high DC voltage generator comprising a first coil, a first DC current supply means for supplying said first coil with a DC current, a resistor connected in parallel with said first coil, a switching means for shutting off the DC current of said first coil while the DC current supplied to said first coil is flowing therethrough, a second coil supplied with a high voltage which is generated when said switching means has made a shut-off action, a second DC current supply means for supplying said second coil with another DC current after the high voltage has been applied to said second coil, and a reverse current blocking means provided between said first coil and second coil for preventing the DC current supplied by said second DC supply means from flowing through said first coil.

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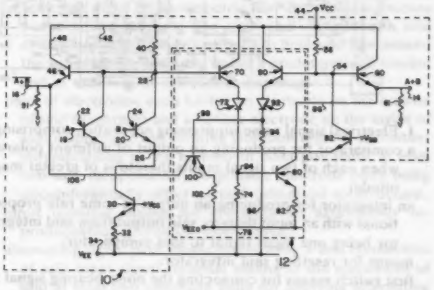
**3,978,347**

## HIGH BAND WIDTH EMITTER COUPLED LOGIC GATE

**Roger L. Hollstein, Phoenix, and Ramachandra A. Rao, Scottsdale, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Filed Oct. 2, 1974, Ser. No. 511,327**
**Int. Cl.² H03K** *19/08*, *5/01*
**U.S. Cl. 307—215** **6 Claims**



**1.** A high band width current switch logic circuit comprising:

a. a current switch logic circuit having input terminals for receiving logic signals,

b. a first emitter-follower output transistor coupled to said current switch logic circuit for providing drive to a first load, and the emitter terminal of said first emitter-follower output transistor constituting a in-phase output terminal means,

c. a second emitter-follower output transistor coupled to said current switch logic circuit for providing drive to a second load, and the emitter terminal of said second emitter-follower output transistor constituting an out-of-phase output terminal means,

d. a first switchable current sink means responsive and coupled to a first internal voltage switching node of said current switch logic circuit and coupled to the emitter terminal of said first emitter-follower output transistor for providing a substantially fixed value of current flow through said first emitter-follower output transistor during switching and quiescent operation of said current switch logic circuit in response to said logic signals, and

e. said first switchable current sink means including a first switchable current source means and an active voltage translating circuit means coupled between said first internal voltage switching node and said first switchable current source means for selectively placing said first switchable current source means either in a high switchable or low conductive state.

## 3,978,348
## ELECTRICAL SIGNAL NOISE SUPPRESSING APPARATUS

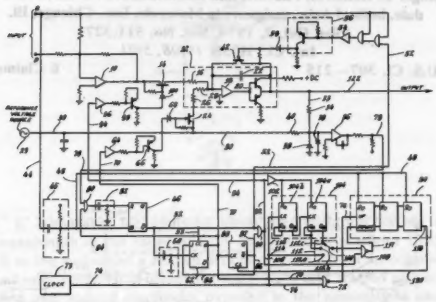
**Heinz W. Henninger, Uhlingen-Muhlhofen; Hans W. Kiefer, NuBdorf; Lothar H. Riethmuller, Uhldingen, and Ernst Gunther Robert Spreitzhofer, NuBdorf, all of Germany, assignors to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen, Germany**

**Filed Oct. 29, 1974, Ser. No. 518,777**

**Claims priority, application Germany, Oct. 26, 1973, 2353664**

**Int. Cl.² G06G** *7/12, 7/18*

**U.S. Cl. 307—229** **8 Claims**



1. Electrical signal noise suppressing apparatus, comprising:
a comparator for producing an output of different polarity when each of two signal inputs thereto is of greater magnitude;
an integrator for producing an output at some rate proportional with an input thereto, said output from said integrator being one input signal to said comparator;
means for resetting said integrator;
first switch means for connecting the noise bearing signal to said integrator input;
a source for supplying a reference voltage;
means for deriving a voltage threshold from said reference voltage, said voltage threshold being the other input to said comparator;
second switch means for connecting said reference voltage to said integrator input;
clock means for generating pulses at a fixed frequency;
a counter for accumulating pulses in two directions and for producing a zero count output, said counter having an up count input and a down count input; and
control means for synchronizing said resetting means with said first and second switch means and for individually gating said clock pulses to said up count and down count inputs, said resetting means being initially actuated by the noise bearing signal with a calibration mode starting immediately thereafter by said second switch means becoming conductive and by said clock pulses being admitted to said up count input until said comparator output changes polarity to again actuate said resetting means, with a measuring mode starting immediately thereafter by said first switch means becoming conductive and by said clock pulses being admitted to said down count input until said zero count output is produced.

## 3,978,349
## SWITCHING CIRCUIT

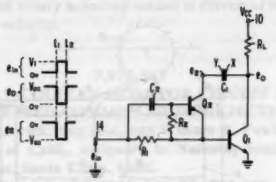
**Robert Anthony Kumbatovic, Cliffwood Beach, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Sept. 3, 1974, Ser. No. 502,672**

**Int. Cl.² H03K** *17/00*

**U.S. Cl. 307—255** **18 Claims**

1. The combination comprising:
first means having an input and an output, said first means being responsive to an input signal for producing an out-of-phase signal at its output;
second means connected to said output for sensing, level shifting, and storing the out-of-phase signal; and



third means connected between said second means and the input to said first means for coupling the stored, level shifted, out-of-phase signal to said input upon the termination of said input signal for turning off said first means rapidly.

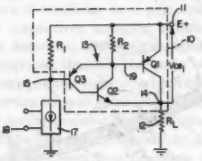
## 3,978,350
## DUAL MODE SOLID STATE POWER SWITCH

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Louis C. Maus, Huntsville, and Donald E. Williams, New Hope, both of Ala.**

**Filed Mar. 11, 1975, Ser. No. 557,444**

**Int. Cl.² H03K** *17/60*

**U.S. Cl. 307—255** **5 Claims**



1. A dual mode solid state power switch comprising:
a. a solid state amplifier having an output stage and an input stage interconnected into a Darlington circuit with an output terminal for conducting load current to an electrical load, and an input terminal;
b. a selectively operable constant current source connected to the input terminal for causing the output stage to operate as a saturated switch when the load current is less than a predetermined value; and
c. active interstage means between the two stages of the solid state amplifier for diverting a portion of the current drive of the output stage from the input stage to the load when the load current exceeds said predetermined value.

## 3,978,351
## QUANTUM INTERFERENCE JOSEPHSON LOGIC DEVICES

**Hans Helmut Zappe, Granite Springs, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 30, 1975, Ser. No. 592,000**

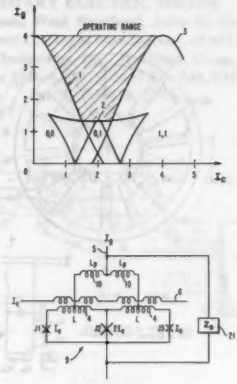
**Int. Cl.² H01L** *39/22;* **H03K** *3/38*

**U.S. Cl. 307—306** **41 Claims**

1. A multiple junction interferometer circuit comprising at least three junctions capable of carrying Josephson current

connected in parallel, and,

means connected to said junctions for setting the phase




difference, $\phi$, across said junctions to substantially the same value with zero control field prior to switching.

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**3,978,352**

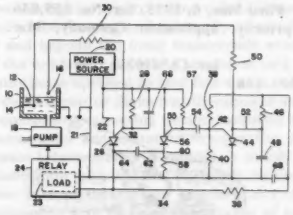
## CONTROL CIRCUIT

**Ronald N. Rose, 5960 Main St. NE., Minneapolis, Minn. 55432**

**Filed Dec. 9, 1974, Ser. No. 531,208**

**Int. Cl.² H03K 17/00**

**U.S. Cl. 307—308** **5 Claims**




1. A control circuit for maintaining a medium between predetermined limits comprising:

upper and lower limit probes operable to detect the presence of said medium at upper and lower limits respectively;

a power source;

medium control means operable to vary said medium at least between said upper and lower limits;

first switching means connected so as to control the flow of power from said power source to said medium control means, said first switching means operable to be switched on by current flow to said upper limit probe;

second switching means connected so as to be operable upon activation to turn off said first switching means; and

third switching means operable only after receiving current from the first switching means when the first switching means passes current to the medium control means, and activated by the cessation of a current flow in said lower probe so as to activate said second switching means.

**3,978,353**

## PIEZOELECTRIC ACOUSTIC SPEAKER SYSTEM

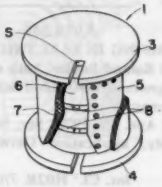
**Shouzo Kinoshita, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed May 6, 1975, Ser. No. 574,983**

**Claims priority, application Japan, May 10, 1974, 49-53106[U]**

**Int. Cl.² H01L 41/08**

**U.S. Cl. 310—8.1** **14 Claims**



1. A piezoelectric acoustic speaker system comprising:

a cylindrical substructure assembly;

at least one piece of piezoelectric film and a holding means connected to adjacent film ends and engaged with said cylindrical substructure assembly to hold said film around the substructure assembly under a predetermined tension and in the form of cylindrical diaphragm;

pairs of electrodes, each having an electrode on the outside of said diaphragm and a further electrode on the inside of said diaphragm, and forming vibration regions of number corresponding to the number of electrode pairs, at least two said independently responsive electrode pairs being circumferentially offset on said cylindrical substructure;

input terminal means for receiving an acoustically reproduceable, alternating input signal;

alternating signal path means establishing a first connection of said input signal terminal means to the electrodes of said at least two electrode pairs for applying alternating input signals related in a first magnitude and phase relation to said two electrode pairs;

switch means interposed in said alternating signal path means and switchable to instead establish at least one differing second connection of said input signal terminal means and pair electrodes for applying alternating input signals related in a second and different relation to said electrode pairs, thereby differently directing sounds reproduced by said speaker system.

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**3,978,354**

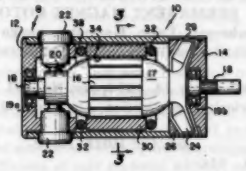
## PERMANENT MAGNET ELECTRICAL MACHINES

**Winston F. Z. Lee, Delmont; James A. Hrivnak, and John R. Speer, both of Pittsburgh, all of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 86,456, Nov. 3, 1970, abandoned. This application Nov. 13, 1972, Ser. No. 305,899**

**Int. Cl.² H02K 9/06**

**U.S. Cl. 310—60 R** **5 Claims**



1. An electrical machine comprising a rotatably mounted armature; high coercivity permanent magnets surrounding

said armature and providing a stationary magnetic field, said magnets being spaced from said armature to provide air gaps therebetween, and said air gaps having a width of at least 0.040 inch and a length to width ratio of 60:1 or less, whereby said gaps provide passages for the flow of cooling air between the armature and magnets; and means for effecting a flow of air through said air gaps to cool said armature, whereby the steady state power rating of said machine can be increased without appreciably increasing the overall dimensions of the machine.

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**3,978,355**

## DAMPING IN ELECTRIC CLOCK

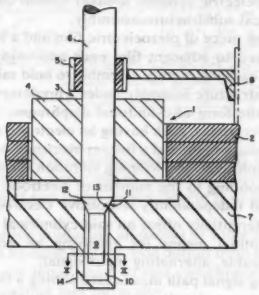
**Paul Höfert, and Roland Sudler, both of Frankfurt am Main, Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Germany**

**Filed Apr. 30, 1975, Ser. No. 573,343**

**Claims priority, application Germany, May 3, 1974, 2421367**

**Int. Cl.² H02K 7/02**

**U.S. Cl. 310—74** **6 Claims**



1. In an electric clock having an electric motor with a stator and a permanent-magnet rotor mounted on a shaft, the shaft being supported at each end and having one end protruding into a damping chamber filled with a damping liquid,

the improvement comprising:

A. closure surfaces formed on the shaft and on the chamber, and

B. means for mounting the rotor on the shaft in a position which is axially displaced from a position of symmetry with respect to the stator in a direction away from the closure surface, and

C. means, operable in any state of operation of the motor in which the stator acts magnetically on the rotor, for causing the stator to generate a component of force on the rotor in a direction which forces the shaft toward the chamber and for thereby effecting a tighter seal of the closure surfaces on the shaft and the chamber.

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**3,978,356**

## SELF-STARTING SYNCHRONOUS MOTOR WITH PERMANENT MAGNET ROTOR

**August Spiesberger, Lahr, Germany, assignor to Gerhard Berger Fabrikation Elektrischer Messgerate, Lahr, Germany**

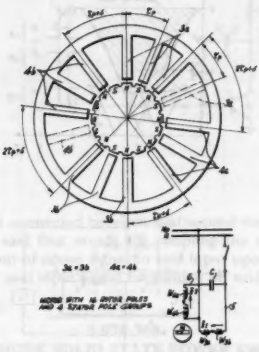
**Filed July 24, 1974, Ser. No. 491,227**

**Claims priority, application Germany, July 26, 1973, 2337905**

**Int. Cl.² H02K 21/12**

**U.S. Cl. 310—156** **22 Claims**

1. A multiphase heteropolar synchronous motor, comprising a permanent magnet rotor having a plurality of rotor poles, a stator surrounding the rotor and having a plurality of inwardly projecting stator poles, *m* phase windings on the poles, the poles forming a plurality of pairs *p* greater than two, the stator being formed of only a single stator body, the stator poles forming groups of three or more poles each with alternating north and south poles, the poles being grouped together at the interior of the stator circumference so that a mechanical



offset angle in excess of 180/mp is formed between the pole groups for *m* phases and within each group the interpole distances of the stator being substantially equal or deviate only slightly from the interpole distances of the rotor, the rotor poles being permanently magnetized with peripherally alternate polarities.

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**3,978,357**

## TACHOMETER MOUNT FOR THE END OF A VEHICLE WHEEL AXLE

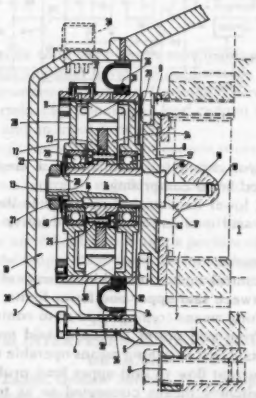
**Heinz Voelbel, and Erich Falke, both of Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany**

**Filed Mar. 6, 1975, Ser. No. 555,836**

**Claims priority, application Germany, Mar. 6, 1974, 2410692**

**Int. Cl.² H02K 5/04**

**U.S. Cl. 310—168** **10 Claims**



1. A mount for an electrodynamic tachometer having a rotor connected to a vehicle axle and a stator and means for rotatably supporting said rotor within said stator, and comprising an annular element of flexible rubber material attached between the stator and a housing enclosing the end of the axle,

said annular element material being relatively stiff with respect to torsion but flexible with respect to axial and radial deflections.

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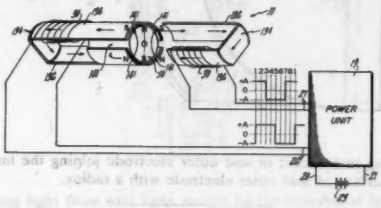
3,978,358

## ROTARY ELECTRIC MOTOR

Arnold C. Johnson, West Hartford; John G. Gamble, Simsbury, and Robert C. Clapp, New Britain, all of Conn., assignors to Veeder Industries, Inc., Hartford, Conn.

Filed Feb. 4, 1975, Ser. No. 546,937
Int. Cl.² H02K 1/12
U.S. Cl. 310—257 13 Claims




1. In a rotary electric motor having an elongated, rotatable, permanent magnet armature and a stator with an annular arrangement of four axially extending stator poles angularly spaced about the armature, the improvement wherein the stator comprises a pair of separate oppositely axially extending two-pole stator subassemblies, each having an axially extending molded plastic stator coil bobbin with axially spaced inner and outer transversely extending end portions and an intermediate axially extending tubular connector for winding a stator coil thereon, a stator coil wound on the tubular connector of the bobbin, and a generally U-shaped stator core with a first elongated leg extending axially inwardly through and beyond the tubular connector and stator coil and beyond the inner transversely extending end portion of the bobbin to provide a first of said axially extending stator poles and a second elongated leg extending axially inwardly generally parallel to the first leg and externally of and beyond the stator coil and beyond the inner transversely extending end portion of the bobbin to provide a second of said axially extending stator poles opposed to said first stator pole and providing therewith a pair of diametrically opposed stator poles; the stator comprising mounting means mounting the pair of stator subassemblies and armature in operative association with the stator subassemblies in oppositely axially extending aligned relationship with their transversely extending inner end portions in a predetermined angularly oriented axially spaced relationship with the two stator poles of each subassembly angularly alternating with the two stator poles of the other subassembly to form said annular arrangement of four stator poles and with the permanent magnet armature mounted coaxially within said annular stator pole arrangement and between the transversely extending axially spaced inner end portions of the molded plastic stator coil bobbins.

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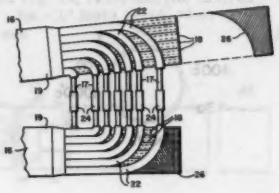
3,978,359

## COIL END INSULATION FOR DYNAMOELECTRIC MACHINES

Robert J. Kultzow, Croton-on-Hudson, N.Y., and Leonard B. Simmonds, Monroeville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 30, 1974, Ser. No. 519,159
Int. Cl.² H02K 3/46
U.S. Cl. 310—260 6 Claims

1. In a dynamoelectric machine having a stator member, a plurality of coils constituting a stator winding, each of said coils comprising two conductors spaced apart on the stator member and having end portions disposed adjacent each other for connection together, each of said conductors comprising a plurality of strands and at least one stack of ventilating ducts, the ducts extending outwardly of said end portions, and a vent cap covering each end conductor, each of said vent caps having an end portion of glass fibers impregnated with a resin and precured in a generally rectangular configuration,



said end portion enclosing the extremities of the ventilating ducts and extending beyond them, and each vent cap having a body portion of glass fibers integral with the end portion, said body portion covering and conforming to the end portion of the conductor and being impregnated with a resin cured in place on the conductor.

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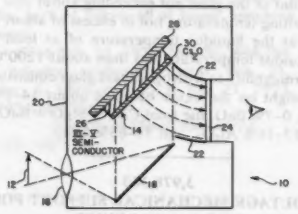
3,978,360

## III–V PHOTOCATHODE WITH NITROGEN DOPING FOR INCREASED QUANTUM EFFICIENCY

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Lawrence William James, Santa Clara, Calif.

Filed Dec. 27, 1974, Ser. No. 536,785
Int. Cl.² H01J 39/06; H01L 31/10
U.S. Cl. 313—94 3 Claims



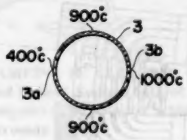

1. A photocathode comprised of a III–V direct band-gap semiconductor material selected from a group consisting of ternary and quaternary compounds that are comprised of a selected one of the following group of paired elements: Ga and As; Ga and Sb; In and As; In and Sb; and In and P, and a deposited layer of activation material forming an emissive surface on said semiconductor material wherein emitted electrons are produced by generation of electron-hole pairs upon absorption of photons by said semiconductor material, said semiconductor material being doped with an element functioning as an acceptor and with an isoelectronic element that introduces a spatially localized energy level just below the conduction band similar to a donor, thus increasing the optical absorption coefficient of said material without compensation of said acceptor dopant, said isoelectronic element being nitrogen and said acceptor dopant being selected from the group consisting of Zn, Mg and Cd.

3,978,361

## LIGHT SOURCE DEVICE

Tatsumi Hiramoto, Himeji, Japan, assignor to Ushio Electric Inc., Tokyo, Japan

Filed Aug. 22, 1975, Ser. No. 606,950
Claims priority, application Japan, Sept. 3, 1974, 49-105321
Int. Cl.² H01J 61/52
U.S. Cl. 313—35 4 Claims




1. A light source device comprising an elongated box-shaped house, a cooling means provided on the back wall of said house, a gutter-shaped reflex mirror having a throat, a tubular elongated light source arranged within and along the axis of said house, and an elongated baffle plate positioned in parallel to and between said light source and said mirror, wherein said baffle plate has a slit arranged along its longitudinal axis and bent portions extending for covering said light source.

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3,978,362

## GLASS ENVELOPE FOR TUNGSTEN-BROMINE LAMP

William H. Dumbaugh, Jr., Painted Post, N.Y.; Roger R. Genisson, Samoreau, and Michel R. Lestrat, Avon, both of France, assignors to Corning Glass Works, Corning, N.Y.

Filed Aug. 7, 1975, Ser. No. 602,778
Int. Cl.² H01K 1/28, 1/50, 7/00
U.S. Cl. 313—221 3 Claims

1. A tungsten-bromine incandescent lamp having an envelope made from a glass exhibiting a strain point above 700°C., a coefficient of thermal expansion (0°–300°C.) in the range of about 48–55 × $10^{-7}$/°C., a mismatch with molybdenum metal at the set point of the glass not exceeding about 250 PPM, an operable melting temperature not in excess of about 1550°C., a viscosity at the liquidus temperature of at least 100,000 poises, a liquidus temperature less than about 1200°C., and a very low permeability to hydrogen, said glass consisting essentially, by weight on the oxide basis, of about 14–21% CaO, 0–5% MgO, 0–7% BaO, the total CaO + MgO + BaO being at least 19%, 13–16% $Al_2O_3$, and 58–63% $SiO_2$.

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3,978,363

## HIGH-VOLTAGE MECHANICAL SUPPORT FOR GAS DISCHARGE DEVICE

John R. Bayless, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

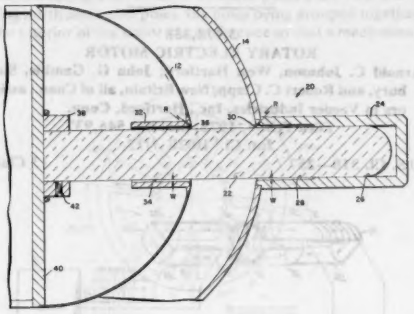
Filed July 22, 1975, Ser. No. 601,101
Int. Cl.² H01J 1/96, 19/50
U.S. Cl. 313—289 7 Claims

1. A high voltage insulator and mechanical support for a gas discharge device, said discharge device comprising:

an inner electrode having an outer surface and an outer electrode having an inner surface, said surfaces being spaced from each other;

feedthrough means for supporting said inner electrode from said outer electrode and for feeding a voltage to said inner electrode separately from said outer electrode;

a high voltage insulator mechanical support spaced from said feedthrough means, said insulator mechanical support comprising a wall in said inner electrode forming a socket extending inwardly into said inner electrode, a wall in said outer electrode forming a socket extending outwardly from said outer electrode and a ceramic post engaging in said sockets for supporting said inner electrode with respect to said outer electrode, said wall forming said socket in said outer electrode joining the inner surface of said outer electrode with a radius.



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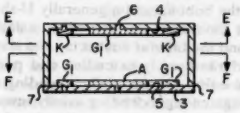
3,978,364

## INTEGRATED STRUCTURE VACUUM TUBE

John Dimeff, San Jose, Calif., and William J. Kerwin, Tucson, Ariz., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 24, 1974, Ser. No. 491,418
Int. Cl.² H01J 1/46, 21/10
U.S. Cl. 313—306 12 Claims




1. Apparatus for an electron discharge device comprising:

a sealed envelope of electrically insulative material with a vacuum environment therein, said envelope having first and second continuous, planar, parallel, separated, opposed surfaces;

a plurality of thin-film electrodes deposited on said first and second surfaces including at least one thermionic cathode electrode and one grid electrode on said first surface, and one anode electrode and one grid electrode on said second surface.

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3,978,365

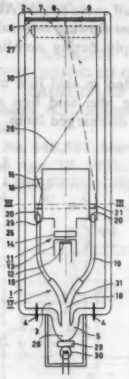
## TELEVISION CAMERA TUBE

Nicolaas Hendrik Limper, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,535
Claims priority, application Netherlands, Apr. 8, 1974, 7404731
Int. Cl.² H01J 31/38, 31/26
U.S. Cl. 313—372 12 Claims

1. A television camera tube having, in an evacuated envelope, a photosensitive target, an electron gun assembly, an anode sleeve extending between the target and the gun assembly, and means for the auxiliary illumination of the target, said auxiliary illuminating means comprising a light source, a hollow light shielding cylinder located within said anode sleeve to define an annular space between its outer wall and an inner wall portion of said sleeve, an annular light distributor disposed within said annular space at such a distance from the

end of the shielding cylinder facing said target as to produce a non-uniform illumination of said target, and means for conducting light from said light source to the distributor in the annular space section remote from said target.



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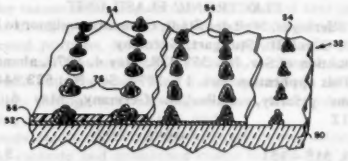
**3,978,366**

## CATHODE RAY STORAGE TUBE HAVING A TARGET DIELECTRIC PROVIDED WITH COLLECTOR ELECTRODE SEGMENTS EXTENDING THERETHROUGH

**Edward R. Steele, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed July 28, 1975, Ser. No. 599,620**
**Int. Cl.² H01J** *29/41, 31/08*
**U.S. Cl. 313—398** **20 Claims**



**1.** A cathode ray storage tube for storing written information comprising:

an envelope having a storage target;

means for generating a high velocity electron beam toward said storage target including means for controlling the movement of said high velocity electron beam over said storage target in accordance with input signals to establish a charge pattern thereon corresponding to the input signals;

means for directing low velocity electrons over said storage target with the low velocity electrons being attracted to said charge pattern causing secondary electrons to be emitted from said charge pattern; and

collector electrode means provided by said storage target for collecting said secondary electrons, said storage target comprising a dielectric support member having an array of micro-sized dielectric bead means secured to an inner surface of said support member, a conductive coating disposed over said inner surface and said array of dielectric means with each of said array of dielectric means having a somewhat conical configuration, said conductively-coated array defining said collector electrode means, and a layer of storage dielectric material on said conductive coating with apices of said collector electrode means extending outwardly from an outer surface of said layer of storage dielectric material.

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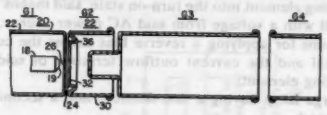
**3,978,367**

## CATHODE RAY TUBE SECOND ELECTRODE HAVING RECTANGULAR PROJECTING RIDGE

**Praveen K. Jariwala, Hammondsport, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Feb. 27, 1975, Ser. No. 553,723**
**Int. Cl.² H01J** *29/46, 29/62*
**U.S. Cl. 313—449** **3 Claims**



**1.** An improved electron gun for use in a color television cathode ray tube, which electron gun comprises a cathode from which an electron beam is emitted, at least a first and second electrode disposed along the electron beam path for controlling and accelerating the electron beam, which first control electrode has a centralized aperture therethrough along the electron beam axis, and which second electrode is adjacent the first electrode, and comprises a generally cylindrical side wall portion, and an end closure portion at the end proximate the first electrode, which end closure portion includes a centralized circular aperture therethrough along the electron beam axis, and a rectangular projecting ridge formed in the end closure about the centralized circular aperture, and projecting from the plane of the end closure toward the open end of the second grid, to thereby comprise an astigmatic electron lens which produces an electron beam which is elongated in cross section in the same direction as the rectangular projecting ridge.

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**3,978,368**

## DISCHARGE LAMP CONTROL CIRCUIT

**Teruichi Tomura, Kunitachi; Hiroyuki Iyama, and Mitsuo Akatsuka, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Feb. 21, 1974, Ser. No. 444,506**
**Claims priority, application Japan, Feb. 21, 1973, 48-20173; Mar. 2, 1973, 48-25413; July 11, 1973, 48-77483; July 11, 1973, 48-77485**
**Int. Cl.² H05B** *41/04, 41/18*
**U.S. Cl. 315—99** **8 Claims**

**1.** A voltage producing device comprising:

an AC power source;

current limiting means including a coil and a capacitor connected in series, one terminal of said current limiting

means being connected to one terminal of said AC power source;

a first unidirectional semiconductor switching element having a current inflow terminal, a current outflow terminal and a control terminal, sasid first switching element having the other terminal of said current limiting means coupled to its current inflow terminal and having the other terminal of said AC power source coupled to its current outflow terminal;

first means for generating a zero voltage for bringing said first switching element into the turn-off state and for maintaining said turn-off state;

second means for generating a voltage for bringing said first switching element into the turn-on state, said means being applied with a voltage from said AC power source;

third means for applying a reverse bias across the control terminal and the current outflow terminal of said first switching element;

a discharge lamp having a first filament and a second filament; and

full-wave rectification means,

one terminal of said first filament and one terminal of said second filament being respectively coupled to said one terminal of said current limiting means and said other terminal of said power source;

the other terminal of said first filament and the other terminal of said record filament being respectively connected to an input portion of said full-wave rectification means, one output terminal of said full-wave rectification means being coupled to said current inflow terminal of said first switching element,

one terminal of said first means and other terminal of said first means being respectively coupled to said control terminal of said first switching element and other output terminal of said full-wave rectification means,

one terminal and other terminal of said first means being respectively coupled to said control terminal of said first switching elelement and other output terminal of said full-wave rectification means,

one terminal and other terminal of said second means being respectively coupled to said one terminal and said other terminal of said first means,

one terminal and other terminal of said third means being respectively coupled to said current outflow terminal of said first switching element and said one terminal of said first means.

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## 3,978,369
## SOLID STATE STARTER APPARATUS FOR A DISCHARGE LAMP

**Ichiro Imaizumi, Kodaira; Teruichi Tomura, Kunitachi; Mitsuo Akatsuka, Tokyo; Mineo Katsueda, Kokubunji; Toshiaki Okada, Tachikawa, and Hiroyuki Iyama, Toyko, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jan. 7, 1975, Ser. No. 539,117**

**Claims priority, application Japan, Jan. 21, 1974, 49-8616**

**Int. Cl.² H05B *41/18***

**U.S. Cl. 315—99** **16 Claims**

1. A discharge lamp lighting circuit comprising:

an AC power supply having two terminals,

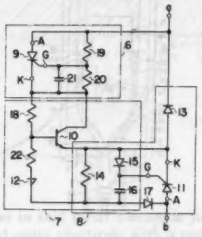
current limiter means,

a discharge lamp with a pair of filaments, each filament having a first terminal and a second terminal, each first terminal of each filament being connected to one terminal respectively of said AC power supply, said first terminal of one of said filament terminals being connected to one of said terminals of said AC power supply through said current limiter means,

a switching circuit connected across both of said second terminals of the respective filaments, each second filament terminal being located on opposite sides of said AC power supply, said switching circuit comprising:

first means connected to one terminal of said second filament terminals for detecting a voltage drop of said discharge lamp produced at a lighting state of said discharge lamp during every half cycle of said AC power supply and for permitting current flowing into said first means from said AC power supply during non-lighted state of said discharge lamp,

second means connected to said first means for switching said current flowing into said first means during non-lighted state of said discharged lamp, the switching causing a pulse voltage to be produced by said current limiter means,



third means connected to said second means for controlling the starting or stopping of a preheating current for said discharge lamp in accordance with said current flowing into said second means after the origination of said pulse voltage during every next half cycle of said AC power supply, the magnitude of said current flowing into said second means at non-lighted state after the origination of said pulse voltage being larger than that at lighted state of said discharge lamp.

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## 3,978,370
## ELECTRONIC FLASH UNIT

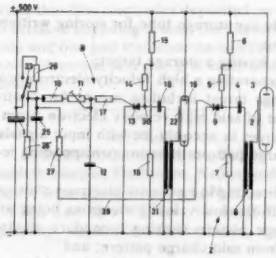
**Albert Stieringer, Weil der Stadt, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Continuation of Ser. No. 357,338, May 4, 1973, abandoned. This application Nov. 11, 1974, Ser. No. 522,944**

**Claims priority, application Germany, May 6, 1972, 2222412**

**Int. Cl.² H05B *37/02***

**U.S. Cl. 315—151** **5 Claims**



1. An electronic flash unit comprising, in combination, a flash element; terminating means operative when triggered for terminating a flash being produced by the flash element; a timing circuit operative when activated for measuring the amount of light reflected back toward the unit from objects being illuminated by the unit and when such amount reaches a predetermined value triggering the terminating means; activating means operable for activating the timing circuit; and igniting means for detecting activation of the timing circuit by

detecting the occurrence of a predetermined electrical change within the timing circuit and in dependence upon such detection igniting the flash element.

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**3,978,371**

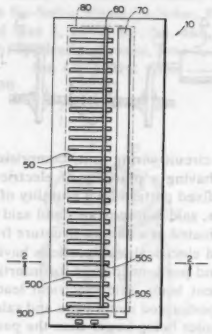
## DISPLAY PANEL USING GLOW SPREADING PRINCIPLES

**Donald E. Miller, Asbury, N.J., assignor to Burroughs Corporation, Detroit, Mich.**

**Continuation of Ser. No. 448,551, March 6, 1974, abandoned. This application Apr. 18, 1975, Ser. No. 569,222**

**Int. Cl.² H01J *61/10*; H05B *41/00***

**U.S. Cl. 315—169 TV** **30 Claims**




1. A display device comprising

a gas-filled envelope including a viewing window,

a glow cathode disposed within said envelope and having a surface exposed to said gas in said envelope and facing said viewing window,

divider means extending across the surface of said cathode and dividing the surface of said cathode into first and second portions, said divider comprising a barrier between said first and second portions, said second portion of said cathode comprising a display cathode and being visible through said viewing window, said first portion being obstructed from view, and

an anode electrode for said cathode positioned adjacent to said cathode and positioned closer to said first portion than said second portion, there being an open current flow path from said anode to the entire surface of said cathode, said path extending directly from said anode to said first portion and across said divider means to said second portion,

said anode and cathode including terminal means whereby said anode and cathode can be connected in a circuit, said circuit being operable at a first level of current flow between said anode and said cathode at which only said first portion of said cathode exhibits cathode glow and operable at a higher level of current flow at which cathode glow spreads across said divider means from said first portion of said cathode to said second portion of said cathode.

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**3,978,372**

## VERTICAL DEFLECTION OUTPUT CIRCUIT

**Shunji Iwabuchi, Yokohama, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Dec. 2, 1974, Ser. No. 529,008**

**Claims priority, application Japan, Dec. 3, 1973, 48-137680[U]**

**Int. Cl.² H01J *29/70*, *29/76***

**U.S. Cl. 315—397** **5 Claims**

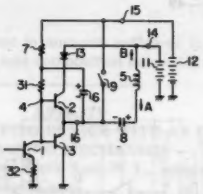
1. A vertical deflection output circuit comprising a first series circuit of first and second output transistors with their emitter-collector paths connected in series and with their current conduction directions arranged in the same sense;

an exciting circuit for turning on said first output transistor during a first half of the vertical scanning period and for turning on said second output transistor during a second half of said vertical scanning period;

means for supplying the output of said exciting circuit for the bases of said first and second output transistors;

a first dc power source connected between the ends of said first series circuit;

a bootstrap capacitor with first and second ends connected respectively with the base and the emitter, of said first output transistor;




means for connecting a second dc power source whose voltage is higher than that of said first dc power source, between the collector and the emitter of said second output transistor via a switch which is turned on during the vertical retrace period and turned off during the vertical scanning period;

a second series circuit of a deflecting coil and a capacitor;

means for connecting said second series circuit between the collector and the emitter, of one of said first and second output transistors; and

means for connecting said first end of said bootstrap capacitor, with said second dc power source via a resistor.

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**3,978,373**

## CIRCUIT BREAKER

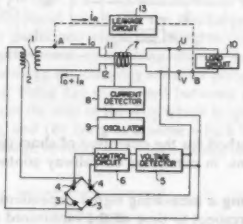
**Hideo Tatsumi, Hitachi, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Jan. 27, 1975, Ser. No. 544,263**

**Claims priority, application Japan, Jan. 30, 1974, 49-11831**

**Int. Cl.² H02H *3/28*, *7/06***

**U.S. Cl. 317—18 D** **5 Claims**




1. A circuit breaker used for a generator having an output circuit for feeding an output of the generator to an exciting coil of the generator through a bridge rectifier circuit including controlled semiconductor rectifier elements, means for detecting the output voltage of the generator, and a control circuit having an output connected with the control electrodes of the rectifier elements for controlling the rectifier circuit in accordance with an output of the output voltage detecting means, said circuit breaker comprising detecting means coupled to the generator output circuit for detecting a leakage current leaking out of the generator output circuit, said leakage current detecting means having an output connected with

said control circuit, said control circuit interrupting feed of an exciting current to the exciting coil in response to the detection of the leakage current.

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3,978,374

## METHOD AND APPARATUS FOR THE DETECTION OF SHORT CIRCUITS

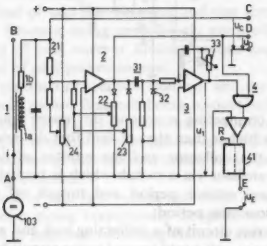
André Rohr, Geneva, Switzerland, assignor to Societe Anonyme des Ateliers de Secheron, Geneva, Switzerland

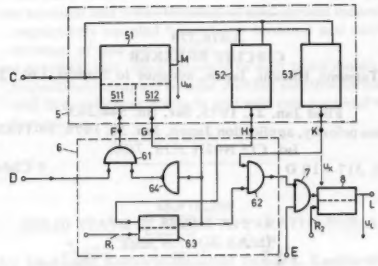
Filed Dec. 6, 1974, Ser. No. 530,147

Claims priority, application Switzerland, Dec. 14, 1973, 17524/73

Int. Cl.² H02H 3/08

U.S. Cl. 317—49 6 Claims





1. A method for the detection of short circuits in electrical installations, in particular on railway contact wires, comprising:

generating a measuring signal dependent on the derivative with respect to time of the monitored current,

comparing the measuring signal with at least one limit value,

determining the time for which the measuring signal exceeds a limit value,

comparing the time with a preset time interval,

initiating indication of a short circuit when the time for which the measuring signal exceeds the limit value also exceeds the time interval,

checking the measuring signal on the occurrence of a decrease following an initial increase and on the occurrence of a subsequent increase, and

generating a blocking signal inhibiting indication of a short circuit as a function of the occurrence of such a subsequent increase.

3,978,375

## WIRING UNIT

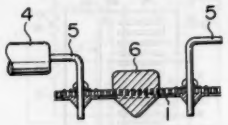
Noriaki Fukui, Hirataka, and Toyokiti Yamasita, Ibaragi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 15, 1974, Ser. No. 460,886

Claims priority, application Japan, July 17, 1973, 48-81747; July 17, 1973, 48-81748; Apr. 20, 1973, 48-47945[U]; July 17, 1973, 48-85378[U]; July 17, 1973, 48-85379[U]; July 17, 1973, 48-85380[U]; July 17, 1973, 48-85381[U]; July 17, 1973, 48-85382[U]; July 17, 1973, 48-85383[U]; July 17, 1973, 48-85384[U]

Int. Cl.² H05K 1/04

U.S. Cl. 317—101 C 8 Claims



1. A printed circuit wiring unit, comprising: a conductive wiring pattern having a plurality of electrical lead portions connected in a fixed pattern by a plurality of removable connecting portions, said lead portions and said connecting portions being fabricated as a unitary structure from a conductive metal plate, said electrical lead portions having holes formed therein at the end portions thereof for insertion therethrough of circuit element leads, said electrical lead portions being formed from a perforated metal plate and said circuit element lead insertion holes being larger than the perforations in said electrical lead portions; and an insulating frame to which said conductive plate is secured, said insulating frame having a plurality of relatively large openings formed therein from which the hole-containing ends of said electrical lead portions project, said openings in said insulating frame permitting movement of substantial amounts of ventilating air through said wiring unit and providing air insulation between non-electrically connected portions of said wiring pattern to substantially eliminate floating capacitance in said wiring unit when said removable connecting portions have been removed.

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3,978,376

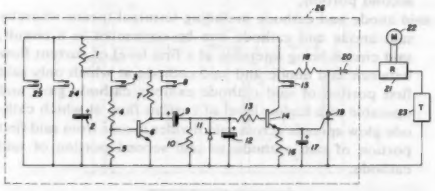
## ELECTRONIC LOCK

Larry E. Wilson, 703 W. Main Cross, Taylorville, Ill. 62568

Filed Sept. 5, 1973, Ser. No. 394,440

Int. Cl.² E05B 49/00

U.S. Cl. 317—134 3 Claims



1. An electronic lock system comprising a voltage source, and electrically responsive locking device, an electrically responsive shorting device, said voltage source, locking device, and shorting device connected in series with each other, first and second capacitors connected in series with each other and in parallel with said shorting device, means for maintaining said first capacitor normally charged and said second capacitor normally discharged, first normally open momentarily actuatable contact means connected to said first capacitor for discharging said first capacitor, second normally open momentarily actuatable contact means connected to said first

and second capacitors for charging said second capacitor through said first capacitor subsequent to the discharge of said first capacitor by said first contact means, and third normally open momentarily actuatable contact means connected to said shorting device for operating said shorting device in cooperation with the charge on said second capacitor, whereby closure of said first, second and third contact means in sequence operates said shorting device thereby operating said locking device.

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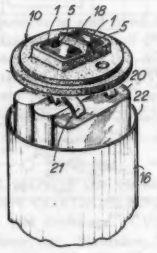
**3,978,377**

## HERMETIC BUSHING FOR TERMINALS FOR ELECTROLYTIC FILTER CAPACITORS

**Jean Constanti, Poissy (Yvelines), France, assignor to Les Condensateurs Sic-Safco, Hauts-De-Seine, France**

**Filed May 3, 1974, Ser. No. 466,557**
**Claims priority, application France, June 7, 1973, 73.20723**
**Int. Cl.² H01G 9/00**
**U.S. Cl. 317—230** **13 Claims**




1. An electrolytic filter capacitor having a case enclosing capacitive members and a bushing for hermetically sealing said capacitor, said bushing comprising a cover having an inner and an outer side made from molded insulating material and a pair of identical, solid, polyhedron shaped terminals having parallel planes of symmetry in the direction of maximum size, said terminals being set within said cover as closely spaced to each other as insulation requirements permit, and having their bases raised above the respective sides of said cover, the outer base defining an exposed contact head which occupies 15–40% of the exposed area of the cover and which is adapted for fastening directly to a bus bar, the inner base being exposed for connection to the capacitor.

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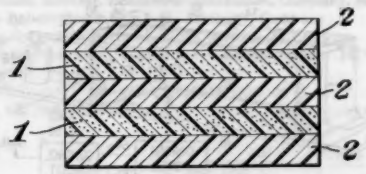
**3,978,378**

## ARTICLES HAVING ELECTROCONDUCTIVE COMPONENTS OF HIGHLY ELECTROCONDUCTIVE RESINOUS COMPOSITIONS

**Reuben A. Tigner, Bay City, and James W. Berg, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 331,509, Feb. 12, 1973, Pat. No. 3,867,315. This application Feb. 13, 1975, Ser. No. 549,594**
**The portion of the term of this patent subsequent to Feb. 18, 1992, has been disclaimed.**
**Int. Cl.² H01G 1/01**
**U.S. Cl. 317—258** **9 Claims**

1. An article having an electroconductive component of an electroconductive resinous composition comprising a resinous material having a volume resistivity greater than $10^8$ ohm-cm as the matrix having dispersed therein a finely divided, copper metal-containing solid wherein copper metal is distributed throughout the solid and constitutes at least 50 volume percent of the solid and a salt selected from the group consisting of chlorides, bromides, bicarbonates, tetraborates and carboxylates of the alkali metals, calcium, zinc, lead, silver, and copper and the fluorides of sodium and potassium, said solid




and salt being present in amounts sufficient to reduce the volume resistivity of said composition below $10^4$ ohm-cm.

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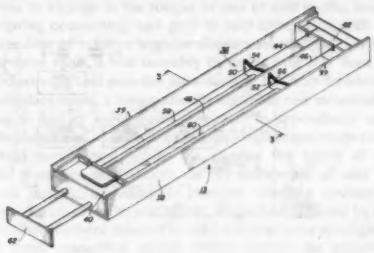
**3,978,379**

## CORONA GENERATING DEVICE WITH AN IMPROVED CLEANING MECHANISM

**George D. DelVecchio, North Rose, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 20, 1974, Ser. No. 525,601**
**Int. Cl.² G03G 15/00; H01J 37/26**
**U.S. Cl. 317—262 A** **4 Claims**



1. An improved corona generating device comprising an elongated conductive shield having a generally U-shaped cross section, the elongated edges of the shield defining a planar discharge opening extending between the edges through which ions may be emitted, a corona wire mounted within and extending along the shield parallel to the discharge opening, a cleaning member positioned within the shield in contact with the wire, the improvement comprising means including a dielectric rod for moving the cleaning member along the wire and shield, the rod being (a) positioned between the shield and the wire adjacent the side of the wire which is opposite the discharge opening, and (b) lying in a plane which is perpendicular to the discharge opening and which passes through the wire.

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**3,978,380**

## RECIPROCATING CORONA PRODUCING APPARATUS

**Peter Guy Talmage, Lexington, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.**

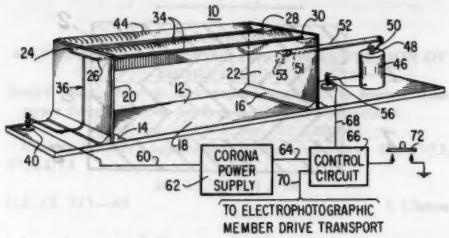
**Filed Mar. 26, 1975, Ser. No. 562,219**
**Int. Cl.² G03G 15/02; H01T 19/00**
**U.S. Cl. 317—262 A** **14 Claims**

1. A corona discharge apparatus for charging an electrophotographic imaging surface including in combination:

corona producing means including at least one elongate longitudinally disposed corona electrode having a first and second end,

support means including a portion for mounting said corona electrode at least at said first and second ends, said sup-

port means corona mounting portion adapted to reciprocate substantially in the longitudinal direction, and




drive means coupled to said support means for reciprocating said support means in said longitudinal direction.

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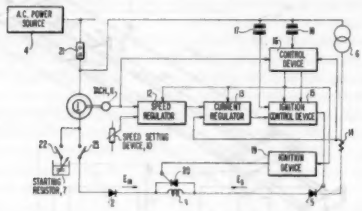
**3,978,381**

## EMERGENCY OPERATION OF A STATIC SCHERBIUS DEVICE

**Shinpei Yamamoto, and Takeshi Uemura, both of Kawasaki, Japan, assignors to Fuji Electric Company, Kawasaki, Japan**

**Filed Apr. 15, 1975, Ser. No. 568,240**
**Claims priority, application Japan, Apr. 23, 1974, 49-46136**
**Int. Cl.² H02P 7/36**
**U.S. Cl. 318—197** **8 Claims**




1. A method for the emergency operation of a static Scherbius device including a wound type induction motor connected to a power source, a converter for converting the secondary a.c. electric power of said induction motor into d.c. electric power, a d. c. reactor for smoothing the d.c. output from said converter, and a controllable commutator-type inverter for inverting the thus smoothed d.c. output into a.c. electric power to be regenerated into the power source, said method comprising detecting an emergency condition in the form of a voltage failure or an abnormal voltage drop and, in response to such detection, shifting from its normal value to a minimum value the angle of advance of the control signals for controlling the operation of the inverter.

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**3,978,382**

## CONTROL APPARATUS FOR TWO-SPEED, SINGLE PHASE COMPRESSOR

**David M. Pfarrer, Hurst, and Sidney A. Parker, Fort Worth, both of Tex., assignors to Lennox Industries Inc., Marshalltown, Iowa**

**Filed Dec. 16, 1974, Ser. No. 532,884**
**Int. Cl.² H02P 1/44**
**U.S. Cl. 318—221 R** **10 Claims**

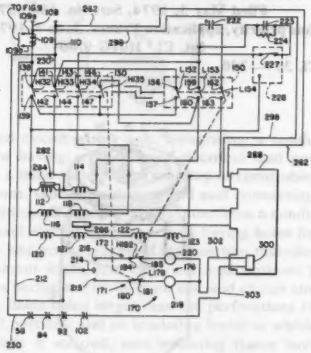
1. In a refrigerant compressor of the type having a compression mechanism for receiving refrigerant gas from a suction line, compressing the refrigerant gas and discharging the compressed refrigerant gas through a discharge line, and a motor for rotating drive shaft means in the compression mechanism at low speed and at high speed, said motor including run windings, low-speed start windings and high-speed start windings, improved apparatus for controlling the operation of the motor from a single phase source of electrical power comprising:

low speed switch means for applying power from the source to the run windings and the low speed start windings to achieve low speed operation;

high speed switch means for applying power from the source to the run windings and the high speed start windings to achieved high speed operation;

a control circuit including a first branch for controlling the high speed witch means and a second branch for controlling the low speed switch means;

electrical interlock means in the control circuit for preventing the simultaneous operation of the low speed switch means and the high speed switch means;



mechanical interlock means to prevent the simultaneous operation of the low speed switch means and the high speed switch means; and

motor protection means for interrupting the flow of current to said winding in response to a stator coil temperature greater than a predetermined value, said motor portection means comprising sensor means for indicating a change in temperature of the low or high speed start windings; and

control means for interrupting the flow of current in the first and second branches in response to an indication from the sensor means that the temperature in the low or high start windings exceeds a predetermined value, so that the control circuit is prevented from operating the low speed switch means or the high speed switch means.

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**3,978,383**

## SPEED CONTROLS FOR ELECTRIC MOTORS

**Terence George Carthy, Macclesfield, England, assignor to Scragg Power Drives Limited, England**

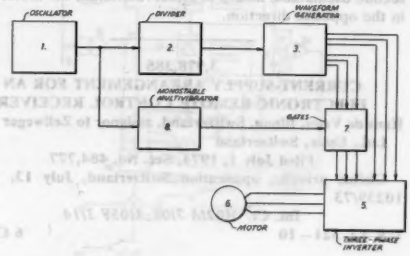
**Filed Dec. 10, 1974, Ser. No. 531,437**
**Claims priority, application United Kingdom, Dec. 19, 1973, 58740/73**
**Int. Cl.² H02P 5/40**
**U.S. Cl. 318—227** **2 Claims**

1. A digital speed control system for an induction motor comprising

i. means for producing a pulsed input signal proportional in frequency to the desired motor speed;

ii. a motor speed setting means, connected to the output of said motor speed pulse producing means, and including means for dividing the number of pulses from said motor speed pulse producing means by a constant factor and a ring counter, connected to be driven by said dividing means, for generating a series of pulse train waveforms for selectively switching an inverter to produce an induction motor power supply; and

iii. motor voltage control means, connected to the output of said motor speed pulse producing means, and including a monostable multivibrator for generating a fixed duration output pulse for each input pulse from said motor speed pulse producing means, and a plurality of mixing gates,




modulated responsive to said fixed duration pulses, connected to the outputs of one-half only of the outputs of said ring counter such that the output voltage of the inverter is controlled to be directly proportional to the frequency of said pulsed input signal and hence to the frequency of the motor power supply.

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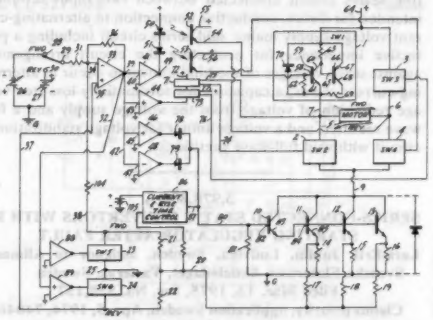
**3,978,384**

## BIDIRECTIONAL MOTOR DRIVE USING SWITCHED AMPLITUDE CONTROLLED CURRENT

George C. Gucker, Old Bethpage, N.Y., assignor to Potter Instrument Company, Inc., Plainview, N.Y.

Filed Apr. 24, 1974, Ser. No. 463,524
Int. Cl.² G05F 1/06
U.S. Cl. 318—261 9 Claims



1. In a system for controlling the direction of rotation of and the current through a DC motor, the combination of;

a four arm bridge in which each arm comprises a signal responsive solid state switch;

a DC motor to be controlled connected across one diagonal of said bridge;

a source of DC current connected through signal responsive current control means across the other diagonal of said bridge;

means for closing a first pair of said switches located in opposite arms of said bridge for energizing said motor in a forward direction;

means for closing the second pair of said switches for energizing said motor in a reverse direction;

and feedback responsive means for controlling the current through said motor by means of said signal responsive current control means.

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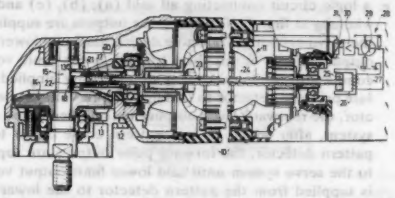
**3,978,385**

## ELECTRIC POWER TOOL WITH TORQUE-DEPENDENT SPEED REGULATION

Reinhold Stroezel, Leinfelden-Oberaichen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 24, 1974, Ser. No. 517,829
Claims priority, application Germany, Nov. 14, 1973, 2356797
Int. Cl.² H02P 7/28
U.S. Cl. 318—337 13 Claims



1. An electric power tool with torque-dependent speed regulation, comprising an electric motor having a drive shaft; a driven output shaft; transmission means for transmitting rotary motion from said drive shaft to said driven shaft, including a gear on said drive shaft; mechanical means movable in response to change in the torque of one of said shafts, including a spring connecting said gear to said drive shaft with limited freedom of relative angular displacement, a tapped bore in said drive shaft, a bolt turnably threaded into said bore and connected with said gear for joint turning but with freedom of axial displacement, a longitudinally shiftable rod mounted for shifting in one or an opposite direction in dependence upon said displacement of said bolt; and varying means cooperating with said mechanical means for varying the speed of said electric motor in dependence on the movement of said mechanical means, including an electric winding operatively connected with said electric motor, and a body carried by said rod for displacement relative to said winding so as to originate in the latter respective signals which control the rotational speed of said electric motor.

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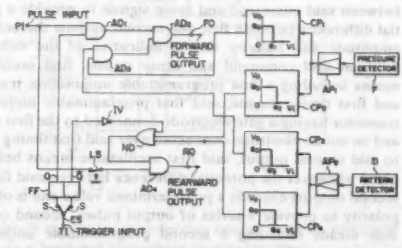
**3,978,386**

## SERVO SYSTEM FOR FINISHING OBJECTS MATERIALS

Hayao Akaba, Akishima; Akira Ikeda, Fussa; Sho Michihiro, Sagamihara, and Masayoshi Lee, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Hoya Lens, Tokyo, Japan

Filed Dec. 6, 1974, Ser. No. 530,489
Claims priority, application Japan, Dec. 18, 1973, 48-142068
Int. Cl.² G05G 5/00
U.S. Cl. 318—626 2 Claims




1. A servo system for finishing objective material lens comprising:

a. a detector for detecting pressure of the objective lens element against the grinding machine for supplying the output voltage therefrom to a plurality of lower and upper limit logic zero in their upper and lower voltages, respectively;
b. said lower and upper limit voltage comparators receiving output voltages from the pattern detector corresponding to the registered pattern where the outputs become logic zero in their lower and upper limit voltages;
c. a pulse input terminal;
d. a flip-flop; and
e. a logic circuit connecting all said (a), (b), (c) and (d); whereby at first the forward pulse outputs are supplied to the servo system for finishing device until said lower limit output voltage is supplied to said lower limit voltage comparator, while said upper voltage being supplied from said pressure detector to said upper limit voltage comparator, the rearward pulse outputs are supplied to the servo system, after which as said pattern come closer to the pattern detector, the forward pulse outputs are supplied to the servo system until said lower limit output voltage is supplied from the pattern detector to the lower limit voltage comparator; and the upper limit voltage being supplied from the pattern detector to the upper limit voltage comparator, the rearward pulse outputs are supplied to the servo system.

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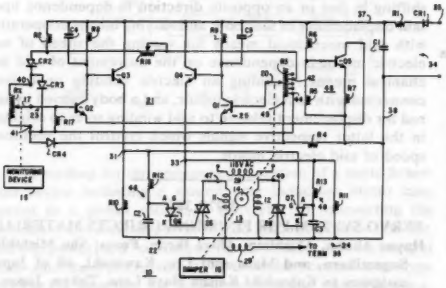
**3,978,387**

## ANALOG SIGNAL COMPARATOR

**Robert G. Nettles, McEwen, Tenn., assignor to Johnson Service Company, Milwaukee, Wis.**

**Filed Mar. 14, 1974, Ser. No. 451,108**
**Int. Cl.² G05F *1/00***
**U.S. Cl. 318—678** **4 Claims**



1. In a motor control circuit for effecting positioning of a motor shaft, analog signal comparator means comprising input means having a first input for receiving a command signal indicative of a desired position for the shaft and a second input for receiving a sense signal indicative of the actual position of the shaft, said input means being responsive to a difference between said command and sense signals to provide a potential difference between first and second outputs thereof of an amplitude and polarity that is indicative of the difference between said command and sense signals, first oscillatable means including a first programmable unijunction transistor and first timing means, said first programmable unijunction transistor having a gate electrode connected to the first output and an anode electrode connected over said first timing means to said second output, said first oscillatable means being enabled whenever the potential difference between said first and second outputs exceeds a predetermined value and is of a first polarity to provide a series of output pulses, second oscillatable means including a second programmable unijunction transistor and a second timing means, said second programmable unijunction transistor having a gate electrode connected to said second output and an anode electrode connected over said second timing means to said first output, said second oscillatable means being enabled whenever the potential difference provided between said first and second outputs exceeds said predetermined value and is of the opposite polarity to provide a series of output pulses, and output means responsive to the series of output pulses provided by said first oscillatable means to control the motor to effect rotation of the motor shaft in one direction, said output means being responsive to the series of output pulses provided by said second oscillatable means to effect rotation of the motor shaft in the opposite direction.

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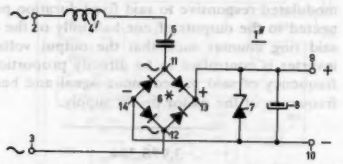
**3,978,388**

## CURRENT-SUPPLY ARRANGEMENT FOR AN ELECTRONIC REMOTE CONTROL RECEIVER

**Hans de Vries, Illnau, Switzerland, assignor to Zellweger Uster Ltd., Uster, Switzerland**

**Filed July 1, 1974, Ser. No. 484,777**
**Claims priority, application Switzerland, July 13, 1973, 10239/73**
**Int. Cl.² H02M *7/08*; G05F *3/14***
**U.S. Cl. 321—10** **6 Claims**



1. A current supply arrangement for an electronic remote control receiver having a selective receiving section which filters out pulse sequences of a given characteristic from voltage signals delivered to its input, comprising a transformer-free series circuit connected between two input terminals intended for direct, conductive connection to alternating-current voltage supply mains, said series circuit including a protective impedance for protecting the circuit arrangement against surge voltages of the kind known to occur in alternating-current mains, a capacitor for substantially loss-free voltage reduction of voltage from the voltage supply and a full-wave rectifier, and a voltage limiter for voltage stabilization in circuit with said full-wave rectifier.

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**3,978,389**

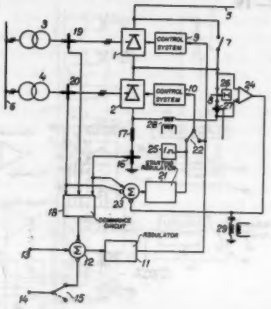
## SERIES-CONNECTED STATIC CONVERTORS WITH RESTARTING REGULATOR AFTER FAULT

**Lars-Erik Juhlin, Ludvika, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden**

**Filed Mar. 13, 1975, Ser. No. 558,157**
**Claims priority, application Sweden, Apr. 5, 1974, 7404602**
**Int. Cl.² H02M *1/18***
**U.S. Cl. 321—13** **6 Claims**

1. A static convertor arrangement comprising at least two static convertors (1, 3 and 2, 4) wherein the direct current sides of said convertors are in series with each other and connected to a direct current line (5) and the alternating current sides of said convertors are connected individually to an alternating current network (6); each individual convertor connected to an individual control system (9, 10) and said individual control system (9, 10) being connected to and controlled by a common regulator means (11); each convertor on its direct current side being parallel-connected to a short-circuit member (7, 8) upon a fault condition occurrng in said convertor whereupon said convertor becomes short-circuit and non-operational; and circuit means for reconnection of a short-circuit convertor to an operational state comprising a starting regulator means (21) having an input and output, and wherein said output is capable of being connected to a short-circuited convertor by a two-way switch contact

(22), said two-way switch contact connecting the individual control system of a convertor alternatively to said starting regulator and said common regulator, and said starting regulating means is provided at its input with a desired value signal



representing the current on the direct current side of said arrangement and an actual valve signal representing the current on the alternating current side of said short-circuited convertor.

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**3,978,390**

## DC-AC INVERTER FOR SUPPLYING A DISCHARGE LAMP

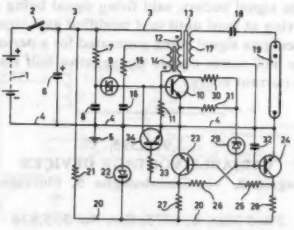
**Michel Remery, Evreux, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed June 24, 1975; Ser. No. 589,764**

**Claims priority, application France, July 3, 1974, 74.23127**

**Int. Cl.² H02M 7/537**

**U.S. Cl. 321—44** **4 Claims**



**1. A DC-AC invertor for supplying a discharge tube comprising, a first transistor connected to a transformer having at least a primary winding, a secondary winding and a coupling winding, means connecting the base electrode of the first transistor via a first threshold element to the junction of a resistor and a capacitor which are connected in a series circuit having a small time constant, means connecting said series circuit between DC supply conductors of the invertor, means connecting the collector of the first transistor via a second threshold element to a control electrode of a bistable auxiliary circuit having an output electrode connected via an auxiliary transistor to the base of the first transistor, means connecting a second capacitor between said control electrode of the auxiliary circuit and a conductor which connects the emitters of two transistors of said auxiliary circuit.**

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**3,978,391**

## DIRECT CURRENT STABILIZING DEVICE

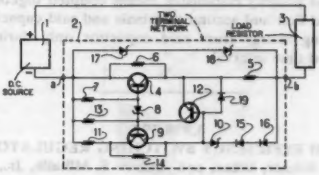
**Rene Migeon, Boulogne, and Yves Legrand, Bois d'Arcy, both of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France**

**Filed Jan. 22, 1975, Ser. No. 543,046**

**Claims priority, application France, Jan. 24, 1974, 74.02402**

**Int. Cl.² G05F 1/58**

**U.S. Cl. 323—4** **3 Claims**



**1. A device for the stabilization of the current supplied by a direct current source for feeding a load, constituted by a two-terminal network connected in series with the said load and comprising: a first transistor and a first resistor, said transistor having an emitter-collector path connected in series with said first resistor, a first terminal of said network being connected to said emitter-collector path, a second terminal of said network being connected to said first resistor, a branch line connected to the base of said first transistor and to said second terminal of said network, a first voltage stabilizing diode in said branch line, a resistor network biassing said first voltage stabilizing diode and arranged between said first diode and said first terminal of said network, a second voltage stabilizing diode in said branch line connected to the base of said first transistor, a second transistor in said branch line having a base connected to said second diode and a collector connected to said first diode, said second transistor having an emitter-collector path connect in parallel with a portion of said resistor network to feed said first diode with stabilized current, and a third transistor having a collector connected to the base of the second transistor and a base-emitter circuit connected in parallel with said first resistor and said first diode.**

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**3,978,392**

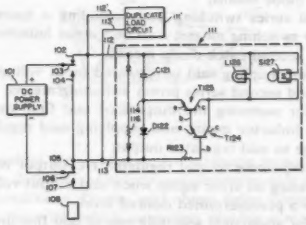
## ENERGY TRANSFER CIRCUIT

**Ignas Budrys, Bethel, and Robert W. Right, Huntington, both of Conn., assignors to General Signal Corporation, Rochester, N.Y.**

**Filed May 8, 1975, Ser. No. 575,568**

**Int. Cl.² G08B 13/22**

**U.S. Cl. 323—16** **18 Claims**



**1. Circuit means for transferring energy from an electrical source to a load and comprising in combination:**

**a. a source of electrical energy having positive and negative terminals;**

b. a load circuit having first and second terminals;
c. coupling means for coupling said first and second terminals of said load to said positive and negative terminals of said source during a first time interval and for coupling said first and second terminals of said load to said negative and positive terms of said source during a second time interval;
d. said load including a capacitor and first polarity responsive means bridged between said first and second terminals for storing energy in said capacitor only during said first time interval; and wherein
e. said load circuit further includes an output device and second polarity responsive means coupled together and to said first and second terminals and said capacitor for drawing energy from said capacitor only during said second time interval.

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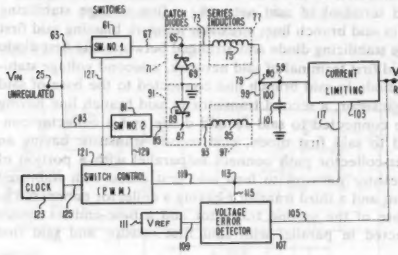
## 3,978,393
## HIGH EFFICIENCY SWITCHING REGULATOR

**Daniel A. Wisner, Milan, and Andrew S. Mihalik, Jr., Northville, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed Apr. 21, 1975, Ser. No. 569,999**
**Int. Cl.² G05F 1/50**
**U.S. Cl. 323—17** **22 Claims**

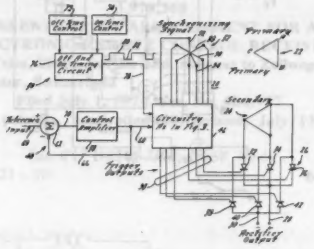



1. A switching regulator for receiving an unregulated input voltage and supplying a regulated DC voltage to its output, said switching regulator comprising:
a first series switching path including a first series power switching means, a first series inductor means, and a first catch diode means;
a second series switching path including a second series power switching means, a second series inductor means, and a second catch diode means;
means for coupling said unregulated input voltage to said first and second series power switching means;
means for summing the outputs of said first and second series inductor means and supplying said regulated DC voltage to said regulator output;
means responsive to said regulated DC output voltage for generating an error signal when said output voltage falls below a predetermined desired level;
means for alternately selecting one of said first and second series power switching means; and
means for supplying drive current to the selected one of said first and second series power switching means and for sustaining said drive current for the duration of said error signal.

## 3,978,394
## LOAD AND LINE BALANCING CIRCUIT

**Bruce R. Quayle, Utica, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.**

**Filed Nov. 25, 1974, Ser. No. 526,926**
**Int. Cl.² H02M 7/155**
**U.S. Cl. 323—19** **19 Claims**




1. A firing control system for controlling the firing of at least one controlled rectifier or the like connected between a source of alternating current energy having positive and negative half waves and a load, the improvement comprising trigger circuit means for generating a firing signal for causing conduction of the controlled rectifier, sensing means connected to the source of electrical energy for generating a control signal in response to an electrical characteristic of the source of electrical energy, gate circuit means for generating at least an original gate signal, and correlating circuit means connected to said trigger circuit means and said sensing means and gate circuit means for generating a modified gate signal in response to the coincidence of said control signal and said original gate signal when said control signal occurs after said original gate signal occurs, said firing signal being precluded from occurring at least until said modified gate signal occurs, said modified gate signal being generated for a period wherein the positive half waves equals the negative half waves of the alternating current energy.

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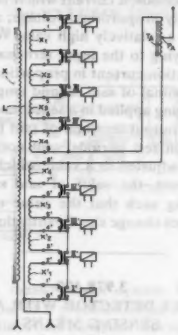
## 3,978,395
## VARIABLE VOLTAGE DEVICES

**Luciano Legnaioli, Via Giambologna 5, Florence, Italy (I-50132)**

**Filed Mar. 6, 1975, Ser. No. 555,826**
**Claims priority, application Italy, Mar. 11, 1974, 9368/74**
**Int. Cl.² G05F 1/14**
**U.S. Cl. 323—43.5 R** **5 Claims**

1. A variable voltage device, comprising a transformer core, primary windings wound on said core, secondary windings wound on said core, the secondary windings being arranged in first and second similar sets each containing a plurality of groups of turns, output terminal means, means connecting the two sets to feed the output terminal means with voltages having the same phase; first switch means for interconnecting the groups of turns of the first set in series and to switch into, or cut out from, the said series selected one or ones of said groups, second switch means interconnecting the groups of turns of the second set in series and operable to switch into, or cut out from the said series a selected one or ones of said groups, and control means operative to control the operation of said switch means in accordance with a predetermined program, the program being such that the groups in each set

are cyclically switched in and switched out at a predetermined rate, said control means being such that the switching operations by the first and second switch means are phase displaced from one another by one half of the switching cycle.



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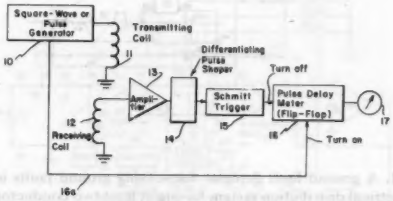
**3,978,396**

## METHOD AND APPARATUS FOR MEASURING ELECTROMAGNETIC CONDUCTIVITY OF A MEDIUM AND FOR DETECTING ANOMALIES THEREIN

**George T. Inouye, Palos Verdes, and Saul Altshuler, Manhattan Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Filed Nov. 6, 1968, Ser. No. 776,307**
**Int. Cl.² G01V 3/10**
**U.S. Cl. 324—6** **3 Claims**




**1.** The method of measuring the electromagnetic conductivity of a non-gaseous conductive medium comprising the steps of:

a. transmitting through said medium an electromagnetic field having a pulse waveform with a stepwise varying energy;

b. detecting the magnetic component of said electromagnetic field caused by said transmitted pulse;

c. transforming said magnetic component into an induced voltage;

d. differentiating said induced voltage, whereby the zero crossing point of the differentiated voltage is a measure of the time of arrival of said magnetic component; and

e. directly measuring the distance travelled by the transmitted electromagnetic pulse and the time required for the travel of said pulse, thereby to obtain an indication of the conductivity of said medium.

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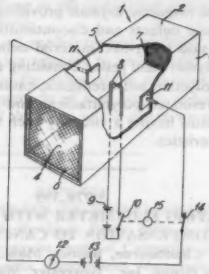
**3,978,397**

## APPARATUS FOR SENSING PARTICLES

**Peter Edwin Burry, Radlett, and Roger Harley Kennedy, London, both of England, assignors to National Research Development Corporation, London, England**

**Filed Dec. 6, 1974, Ser. No. 530,150**
**Claims priority, application United Kingdom, Dec. 6, 1973, 56499/73; Apr. 26, 1974, 18379/74**
**Int. Cl.² G01N 27/00, 31/00**
**U.S. Cl. 324—33** **6 Claims**



**1.** Apparatus for sensing the presence of solid particles within a gas comprising:

a chamber to contain a mass of the gas;

ionisation means to ionise the contained mass;

detector means operable on the contained mass;

time delay means, associated with the ionisation and detector means, to establish a substantially unvarying time interval between the exposure of each mass of gas to the ionisation means and its exposure to the detector means, and

signal producing means associated with the detector means to yield a signal derived from the ionisation of the mass to indicate the concentration of solid particles within the gas.

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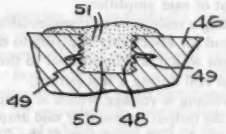
**3,978,398**

## METHOD FOR NONDESTRUCTIVE MAGNETIC INSPECTION OF AN OBJECT EMPLOYING A PUTTY-LIKE MAGNETIC RECORDING MEDIUM

**Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Nov. 29, 1973, Ser. No. 420,327**
**Int. Cl.² G01R 33/12**
**U.S. Cl. 324—37** **11 Claims**




**1.** A method for nondestructive magnetic inspection of an object, for detection of defects and discontinuities and metallurgical conditions therein, said object being composed of a magnetic material, which comprises placing a magnetic recording medium in the form of a magnetizable putty-like material containing magnetic particles distributed therein, on a surface of said object, establishing a field of magnetic flux lines relative to said object and said recording medium thereon, recording on said magnetic putty-like recording medium magnetic indications or signals of the configurations

of said defects and discontinuities and metallurgical conditions in said object, removing said magnetized putty-like recording medium from said object, placing on said magnetized putty-like recording medium a viewing device for observation of said magnetic indications recorded on said recording medium, said device comprising means enclosing a suspension of weakly magnetic crystals which orient when suspended in liquid in a magnetic field, in a transparent liquid vehicle and a transparent portion to permit viewing said suspension, causing said weakly magnetic crystals in said suspension to reorient so as to reproduce said magnetic indications from said recording medium, and viewing in said device said suspension of reoriented magnetic crystals providing said magnetic indications of said defects and discontinuities and metallurgical conditions, said putty-like material being selected from the group of polymers and resins consisting essentially of silicone polymers, polyether polyurethanes, natural rubber, neoprene, carboxyl terminated polybutadiene and guar gum, said polymers and resins having a viscosity such that they have putty-like characteristics.

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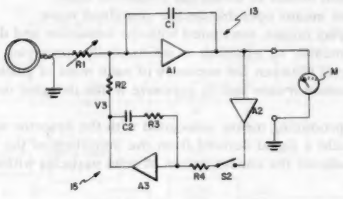
**3,978,399**

**INTEGRATING FLUXMETER WITH INPUT CURRENT COMPENSATION TO CANCEL DRIFT**

**Thomas G. Chadbourne, Boston, Mass., assignor to Walker Magnetics Group, Inc., Worcester, Mass.**

**Filed Feb. 14, 1975, Ser. No. 550,115**
**Int. Cl.[2] G01R *33/02*; H03F *1/02***
**U.S. Cl. 324—43 R** **1 Claim**




1. In a fluxmeter of the type in which flux is measured by integrating the voltage generated in a coil over a test period during which the flux linking the coil is changed, a test circuit comprising:

a first amplifier, said amplifier having an output terminal and an input terminal and being of relatively high gain, there being a signal inversion between said terminals;

an integrating capacitor connected between said input terminal and said output terminal causing the voltage developed at said output terminal to vary as an integral over time of any current applied to said input terminal, less the bias current of said amplifier;

means including a resistance of preselectable value in series with said coil for selectively applying to said input terminal a current which is proportional to the voltage generated in said coil during a test period;

means for utilizing a voltage which is proportional to the voltage at the output terminal of said amplifier at the end of a test period as an indication of the flux change;

a second amplifier, said amplifier having an output terminal and an input terminal and having substantial gain, there being a signal inversion between the input and output terminals of said second amplifier;

feedback means, including a second integrating capacitor and a phase-shifting resistor in series with said second capacitor, connected between the output terminal and the input terminal of said second amplifier causing the voltage developed at the output terminal to vary substantially as a function of the integral over time of a current applied to the input terminal;

an inverting circuit for providing a voltage which is inversely proportional to the output voltage of said first amplifier;

means including a switch and a series resistor for selectively applying to the input terminal of said second amplifier, between test periods, a current which varies as a function of said inversely proportional voltage; and

means including a relatively high value resistance for continuously applying to the input terminal of said first amplifier a correction current in proportion to the voltage at the output terminal of said second amplifier, the correction current being applied in a sense tending to reduce the voltage at the output terminal of said first amplifier,

whereby, between test periods, said correction current is automatically adjusted to a value which compensates for said bias current, the value of said second integrating capacitor being such that the value of said correction current does not change significantly during a test period.

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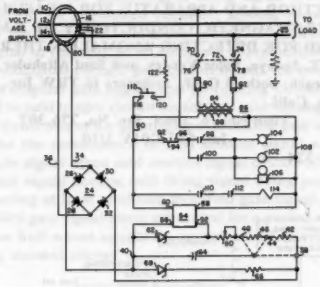
**3,978,400**

**GROUND FAULT DETECTOR WITH A NONLINEAR SENSING MEANS**

**Dorn L. Pettit, Wauwatosa, Wis., assignor to Square D Company, Park Ridge, Ill.**

**Filed Nov. 25, 1974, Ser. No. 526,568**
**Int. Cl.[2] G01R *31/02*; H02H *3/16***
**U.S. Cl. 324—51** **3 Claims**



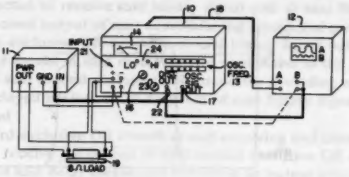

1. A ground fault detector for sensing ground faults in an electrical distribution system having at least two conductors of the type wherein the electrical distribution system is ungrounded comprising:

a differential current transformer positioned to sense the non-zero summation of currents in the conductors of the system, a secondary winding on the transformer and a rectifying means providing a direct current signal indicative of the magnitude of the non-zero summation of the currents of the system, a sensing circuit responsive to the direct current signal to produce an output, a switching means responsive to the sensing circuit output whenever the sensing circuit output exceeds a selected fraction of the magnitude of the direct current signal, a means for varying impedance of the sensing circuit and thereby the value of said selected fraction of the direct current signal so that the selected fraction is greater when the magnitude of the direct current signal is less than the predetermined level and less when the magnitude is greater than the predetermined level.

## 3,978,401
## DISTORTION MEASUREMENT SYSTEM

Jack G. S. Lum, Sunnyvale, Calif., assignor to Sound Technology, Inc., Campbell, Calif.

Division of Ser. No. 509,118, Sept. 25, 1974. This application Oct. 29, 1975, Ser. No. 626,758
Int. Cl.² G01R 27/00
U.S. Cl. 324—57 N 10 Claims




1. A distortion measurement system for measuring the distortion in a signal of a predetermined frequency comprising: an ultra low distortion oscillator having frequency selective elements; analyzer means including notch filter means having frequency selective elements and a constant response in the passband; and means for ganging said frequency selective elements of said oscillator and analyzer means during changes in said predetermined frequency.

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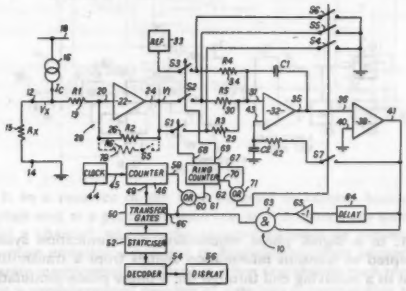
## 3,978,402
## APPARATUS FOR PRODUCING AN ELECTRICAL OUTPUT SIGNAL WHOSE MAGNITUDE IS LINEARLY REPRESENTATIVE OF THE VALUE OF AN UNKNOWN RESISTANCE

Alan Ryder, Church Crookham, England, assignor to The Solartron Electronic Group Limited, Farnborough, England

Filed Feb. 26, 1975, Ser. No. 553,378
Claims priority, application United Kingdom, Mar. 6, 1974, 10002/74
Int. Cl.² G01R 27/02
U.S. Cl. 324—62 36 Claims




1. Apparatus for producing an electrical output signal whose magnitude is linearly representative of the value of an unknown electrical resistance, the apparatus comprising:

means for passing a current through the unknown resistance to generate an analogue voltage thereacross whose magnitude is dependent on the value of the unknown resistance;

integrating means;

first circuit means for applying the analogue voltage to the integrating means during a first time interval, so as to drive the level of the signal at the output of the integrating means away from a datum value;

a source of a reference signal;

second circuit means for applying the reference signal to the integrating means during a second time interval which succeeds the first time interval so as to drive the level of the signal at the output of the integrating means back towards the datum value; and

means responsive to the level of the signal at the output of the integrating means for producing an output signal whose magnitude is representative of the ratio between the respective durations of said first and second time intervals;

third circuit means for applying a predetermined multiple of the analogue voltage to the integrating means during the second time interval;

the magnitude of sid predetermined multiple of the analogue voltage being selected to ensure that said ratio is linearly related to the value of the unknown resistance, whereby the magnitude of said output signal is linearly representative of the value of the unknown resistance.

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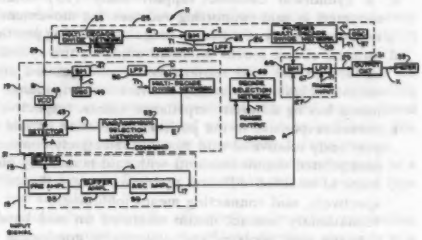
## 3,978,403
## AUTOMATIC TRACKING SIGNAL ANALYZER

Richard S. Mansfield, Newbury Park; John A. McCracken, and Robert J. Youngquist, both of Camarillo, all of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 6, 1974, Ser. No. 467,407
Int. Cl.² G01R 23/16; H03B 3/08
U.S. Cl. 324—77 A 17 Claims



1. A signal analyzer for individually analyzing selected harmonics of an input signal, including

means for generating first and second reference signals which differ from each other by a small offset frequency;

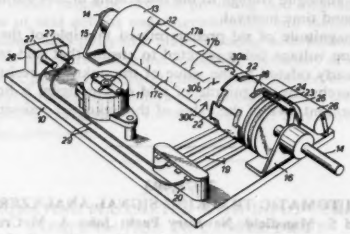
a first loop responsive to the input signal and the first reference signal for providing an intermediate carrier signal, the frequency of which is the sum of the frequencies of the first reference signal and the selected harmonic of the input signal; and

a second loop including means for modulating the intermediate carrier signal with the second reference signal to provide a measurement carrier signal having a frequency equal to the difference between the frequencies of those signals and further including means for modulating the measurement carrier signal with the input signal to provide an output signal having characteristics indicative of the magnitude of the selected harmonic of the input signal.

## 3,978,404
## INDICATING OR MEASURING INSTRUMENTS

Terence Friend, Dover, England, assignor to Taylor Electrical Instruments Limited, England

Division of Ser. No. 443,323, Feb. 19, 1974, Pat. No. 3,895,291. This application Apr. 1, 1975, Ser. No. 564,112
Int. Cl.² G01R 15/08
U.S. Cl. 324—115 3 Claims

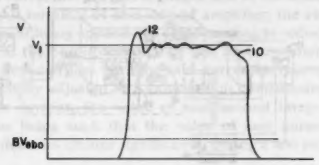


1. A multi-range electrical instrument, comprising:
a. a generally hollow base (53) including aligned supporting recesses (54, 55) at opposite ends thereof;
b. an electrical measuring instrument (11) mounted upon said base;
c. a cylindrical ceramic support body (13) rotatably mounted in said supporting recesses for movement between a plurality of different range-establishing positions;
d. printed circuit means mounted adjacent the cylindrical surface of the said support body, said printed circuit means including a plurality of electrical impedance elements having different impedance values, respectively;
e. means responsive to the position of rotation of said support body relative to said base for selectively connecting said printed circuit elements with said measuring instrument to establish different operating ranges thereof, respectively, said connecting means including:
1. stationary contact means mounted on said base between said recesses and electrically connected with said measuring instrument, said stationary contact means including a plurality of electrically conductive elongate members (61–63) mounted on said base; and
2. a plurality of movable contact means (59) mounted adjacent of said cylindrical ceramic support body and electrically connected with different ones of said impedance elements, respectively, said movable contact means being disposed on said cylindrical support body for selective electrical connection with the stationary contact means upon rotation of said body relative to said base;
f. means for connecting some of said stationary contact means (60, 62) with a voltage source;
g. means (56) for rotating said support body between different ones of said range-establishing positions;
h. lid means (L) enclosing said hollow base and containing a window; and
i. a plurality of different scales mounted on said cylindrical support body in overlying relation to said printed circuit means, the scales corresponding with respective ones of said range-establishing positions and having such a disposition relative to said contact means as to be displayed at said window upon establishment of respective one of said operating ranges by rotation of said cylindrical support body.

## 3,978,405
## DAMAGE THRESHOLDS OF P-N JUNCTION DEVICES BY A CURRENT PULSE METHOD

Marcella C. Petree, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 7, 1975, Ser. No. 547,834
Int. Cl.² G01R 31/22
U.S. Cl. 324—158 T 8 Claims

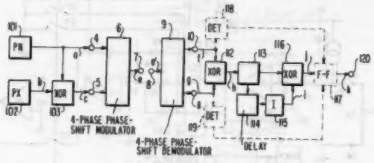



1. An improved method for determining the damage threshold of a semiconductor p-n junction comprising the steps of:
applying a reverse polarity constant current pulse of less than 100 nanoseconds in duration to said p-n junction;
measuring elapsed time from the initial application of said constant current pulse to a point at which second breakdown occurs indicated by a significant drop in breakdown voltage;
calculating said damage threshold of said p-n junction from a time integral of said breakdown voltage over said elapsed time multiplied by said constant current level.

## 3,978,406
## CODE ERROR DETECTING SYSTEM IN DIGITAL CODE TRANSMISSION

Youichi Matsumoto; Seijiro Yokoyama, and Tadao Shimamura, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Aug. 11, 1975, Ser. No. 603,901
Claims priority, application Japan, Aug. 14, 1974, 49-93001
Int. Cl.² H04L 1/10
U.S. Cl. 325—41 8 Claims




1. In a digital phase modulation communication system adapted to transmit information signals from a transmitting end to a receiving end through the 4-phase phase-modulation of a high-frequency carrier wave, said communication system including a 4-phase phase-modulating means at said transmitting end and having first and second inputs for receiving encoder outputs to modulate said carrier wave and means having first and second outputs at said receiving end for demodulating the transmitted 4-phase phase-modulated carrier wave and converting it into a binary signal pair at said first and second outputs, a code error detecting system comprising:
means at said transmitting end for generating an output train of pseudo-random code patterns, said output train of pseudo-random code patterns being supplied to said first input of said modulating means,
means at said transmitting end for generating an output train of complementary code patterns which are comple-

mentary to each other at intervals of *n*-bits where *n* is a positive integer,

a first exclusive OR circuit at said transmitting end connected to receive said output train of pseudo-random code patterns and said output train of complementary code patterns and supplying an exclusive OR function of said output trains to said second input of said modulating means,

a second exclusive OR circuit at said receiving end connected to receive said binary signal pair at said first and second output of said demodulating means and providing an exclusive OR function of said binary signal pair,

delay means at said receiving end connected to the output of said second exclusive OR circuit for providing an *n*-bit delayed exclusive OR function of said binary signal pair, and

a third exclusive OR circuit at said receiving end connected to receive the output of said second exclusive OR circuit and said delay means and providing an output error pulse code train.

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**3,978,407**

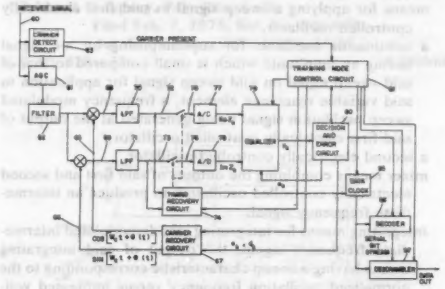
## FAST START-UP ADAPTIVE EQUALIZER COMMUNICATION SYSTEM USING TWO DATA TRANSMISSION RATES

**George D. Forney, Jr., Cambridge, and James C. Hart, Medfield, both of Mass., assignors to Codex Corporation, Newton, Mass.**

**Filed July 23, 1975, Ser. No. 598,244**

**Int. Cl.² H04L *1/10***

**U.S. Cl. 325—42** **10 Claims**



**1.** In a receiver of the type adapted to receive bursts of signals sent at a predetermined rate of 1/T signals per second over a channel, wherein the receiver includes an automatic adaptive equalizer operative to facilitate accurate reception despite intersymbol interference when said signals each represent a predetermined number of data bits corresponding to a first selected high rate of data transmission, that improvement comprising

circuitry for enabling said receiver to process during an early segment of a said burst of signals, each signal of said segment representing fewer than said predetermined number of data bits, corresponding to a second selected rate of data transmission lower than said first rate, at which second rate said receiver is capable of accurate reception without complete adaptation of said equalizer,

circuitry for using signals in said segment to adapt said equalizer in a decision-directed mode, and

circuitry or enabling said receiver to process said signals at said first rate of data transmission upon completion of said adaptation.

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**3,978,408**

## CIRCUIT ARRANGEMENT FOR SELECTING A DIVERSITY CHANNEL

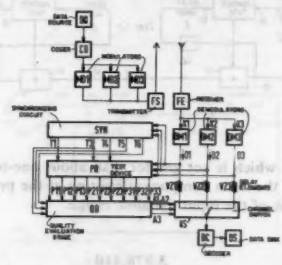
**Jutta Das Gupta, Wolfratshausen; Wernhard Markwitz, and Max Ollinger, both of Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Dec. 5, 1974, Ser. No. 529,826**

**Claims priority, application Germany, Dec. 6, 1973, 2360930**

**Int. Cl.² H04B *7/08***

**U.S. Cl. 325—56** **7 Claims**



**1.** In a data transmission system, apparatus for selecting one of a plurality of diversity channels, comprising:

receiving means for receiving data-modulated signals transmitted in each of said diversity channels, said data-modulated signals including binary data modulating signals which assume one of two binary states in time succession and wherein transitions between the two states occur within predetermined test periods,

demodulating means for demodulating said received data-modulated signals and producing demodulated outputs on each of said diversity channels,

test means for receiving said demodulated outputs and for producing therefrom test signals of a first type indicating the absence of binary transitions in a said demodulated output and test signals of a second type indicating the presence of distortions in a said demodulated output,

quality evaluation means for producing control signals as a function of said first type test signals and said second type test signals and

channel switch means for selectively connecting, responsive to said control signals, one of said diversity channels to a data sink.

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**3,978,409**

## SIGNAL COMPRESSORS AND EXPANDERS

**Ray Milton Dolby, and Paul Anthony Spencer, both of San Francisco, Calif., assignors to Dolby Laboratories, Inc., San Francisco, Calif.**

**Continuation-in-part of Ser. No. 346,689, March 30, 1973, abandoned. This application June 7, 1974, Ser. No. 477,205**

**Claims priority, application United Kingdom, Apr. 4, 1972, 15484/72**

**Int. Cl.³ H04B *1/62***

**U.S. Cl. 325—62** **59 Claims**

**58.** A method of modifying, within a predetermined frequency band, the dynamic range of an input signal having an input dynamic range with a predetermined upper limit, comprising the steps of providing, at least within the predetermined frequency band, a main signal component derived from the input signal, forming within the predetermined frequency band a difference signal between a second signal component derived from the input signal and a delayed version of a third signal component derived from the input signal, the delay of the delayed third signal component delaying the third signal component relative to the second signal component, combining the said difference signal with the main component to

modify the main component when said difference signal exists, and restricting the said difference signal to a predetermined

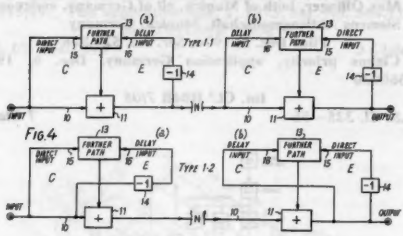

FIG. 4

amplitude which is not greater than about one-tenth the amplitude of the main component existing at the predetermined upper limit of the input dynamic range.

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**3,978,410**

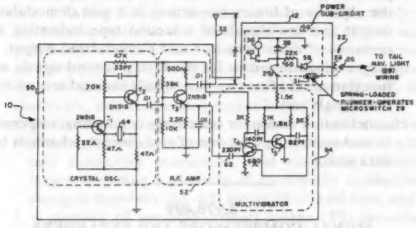
**AIRCRAFT-MOUNTED CRASH-ACTIVATED TRANSMITTER DEVICE**

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Robert Manoli, Huntington Beach, and Bertram R. Ulrich, Whittier, both of Calif.**

**Continuation-in-part of Ser. No. 307,714, Nov. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 82,279, Oct. 20, 1970, abandoned. This application Oct. 3, 1974, Ser. No. 511,894**

**Int. Cl.² H04B 1/02**

**U.S. Cl. 325—114** **10 Claims**




**10.** In combination with the exterior surface of an aircraft having a recess, an improved aircraft-crash location device, comprising:

a. a radio transmitter having a sealed cylindrical housing forming an outer case with a circumferential channel on the periphery of said case;

b. means releasably securing said case on said aircraft in said recess;

c. an antenna having one end connected to said radio transmitter;

d. said antenna being an elongated concave-formed metal blade with spring-back quality wrapped around said case within said circumferential channel, the opposite end of said antenna abuting the surface of said aircraft in said recess; and

e. said antenna being capable of unfurling itself helically by springing outwardly and unwinding itself from the circumferential channel of said case when said case is released from said recess.

**3,978,411**

**SWEEP OUTPUT GENERATOR HAVING A FREQUENCY MODULATED LOCAL OSCILLATOR FOR THE STATION SELECTOR OF A TELEVISION RECEIVER**

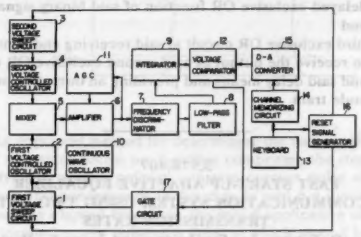
**Yoichi Sakamoto, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 26, 1974, Ser. No. 527,271**

**Claims priority, application Japan, Nov. 30, 1973, 48-135528; Nov. 30, 1973, 48-135529; Nov. 30, 1973, 48-135530; Nov. 30, 1973, 48-135531; Nov. 30, 1973, 48-135532**

**Int. Cl.² H04B 1/34**

**U.S. Cl. 325—421** **4 Claims**




**1.** A sweep output generator for a station selector comprising:

a first electrically controlled oscillator including a variable reactance element, said oscillator having an oscillation frequency versus impressed voltage or current characteristic,

means for applying a sweep signal to said first electrically controlled oscillator,

a continuous oscillator for superimposing an a-c signal having an amplitude which is small compared to that of said sweep signal on said sweep signal for application to said variable reactance element, a frequency modulated sweep oscillation signal being generated at the output of said first electrically controlled oscillator,

a second electrically controlled oscillator,

mixer means combining the outputs of said first and second electrically controlled oscillators to produce an intermediate frequency signal,

integrating means for integrating said demodulated intermediate frequency signal, the output of said integrating means having a sweep characteristic corresponding to the normalized oscillation frequency versus impressed voltage or current characteristic of said first electrically controlled oscillator,

reference signal generating means for generating a reference signal corresponding to a station to be selected,

comparison means for comparing the output of said integrating means with said reference signal, and

means coupled to the output of said comparison means and to said first electrically controlled oscillator for terminating the sweep signal to said first electrically controlled oscillator when said compared voltages coincide, the desired station being thereby selected.

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**3,978,412**

**RADIO RECEIVER NOISE SUPPRESSION**

**Marvin E. Frerking, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 2, 1975, Ser. No. 574,054**

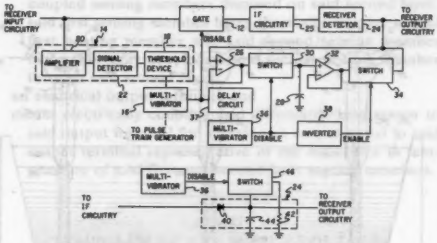
**Int. Cl.² H04B 1/16**

**U.S. Cl. 325—478** **16 Claims**

**1.** A noise suppression circuit for use in a radio receiver having a noise blanker circuit which is actuated to block the passage of receiver signals to the receiver detector whenever

the noise content exceeds some predetermined threshold level, comprising:

clamp circuit means having an output signal which tracks an input signal applied thereto and maintains the last tracked level during a subsequent absence of input signal, and




switching circuit means for connecting to the radio receiver detector output, the output of said clamp circuit means for a predetermined period each time the noise blanker circuit is actuated and the input of said clamp circuit means at all other times.

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**3,978,413**

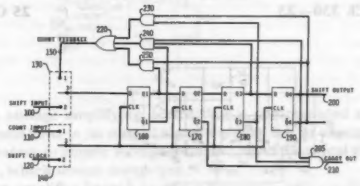
## MODULUS COUNTER CIRCUIT UTILIZING SERIAL ACCESS

**Robert Alan Frohwerk, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Feb. 7, 1975, Ser. No. 548,048**

**Int. Cl.² G11C *19/00*; H03K *23/00***

**U.S. Cl. 328—37** **6 Claims**




1. A circuit comprising:

a shift register having a clock input, a data input and a data output and a plurality of memory elements;

first circuit means coupled to the shift register for producing a feedback signal in response to selected states of the shift register;

switching means having selectable count and shift states, and having inputs for receiving a shift signal, a count signal, a shift clock signal, and a state control signal, said switching means coupled to the first circuit means for receiving said feedback signal and coupled to the shift register for applying the shift signal to said data input and the shift clock signal to said clock input when said shift state is selected, and for applying the feedback signal to said data input and the count signal to said clock input when said count state is selected, said switching means selecting said count and shift states in response to only said state control signal.



**3,978,414**

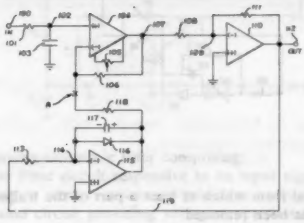
## APPARATUS AND METHOD FOR TAKING THE DERIVATIVE OF A SLOWLY VARYING ELECTRICAL SIGNAL

**Robert E. Bober, Framingham, and Robert G. Lavallee, Ashland, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.**

**Filed Mar. 25, 1975, Ser. No. 561,748**

**Int. Cl.² H03K *3/04***

**U.S. Cl. 328—132** **9 Claims**




1. A circuit, capable of use with apparatus that generates at least one slowly varying signal such as a signal generated by organic cells osmotic fragility measuring apparatus, for providing an output signal representative of the derivative of said slowly varying signal, said circuit comprising:

input amplifier means for accepting said slowly varying signal on one input terminal thereof;

output amplifier means responsive to the output of said input amplifier means for providing said output signal;

first feedback means connected between said output of said input amplifier means and another input terminal thereof for providing a first feedback signal; and,

second feedback means connected between output of said output amplifier means and said another input terminal of said input amplifier means for providing a second feedback signal,

said first feedback means and said second feedback means cooperating to tend to reduce said output of said input amplifier means toward zero whereby said output amplifier provides said output signal.

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**3,978,415**

## CHROMATOGRAPHIC ANALYZER SIGNAL RESOLUTION

**Donald D. DeFord, Glenview, Ill., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

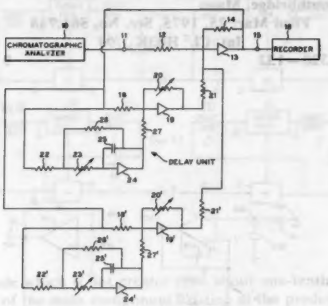
**Filed Sept. 23, 1974, Ser. No. 508,622**

**Int. Cl.² H04B *1/04*; G01N *31/08***

**U.S. Cl. 328—165** **14 Claims**

1. In a chromatographic analyzer in which an output signal is established which varies in amplitude in accordance with changes in composition of the effluent from a separation column therein; the improvement comprising apparatus to remove trailing edges from peaks in the output signal comprising means responsive to the output signal to establish a de-

layed signal derived from the output signal, and means to sum the delayed signal and the output signal to establish a composite signal from which at least a part of the trailing edge of a peak has been removed.

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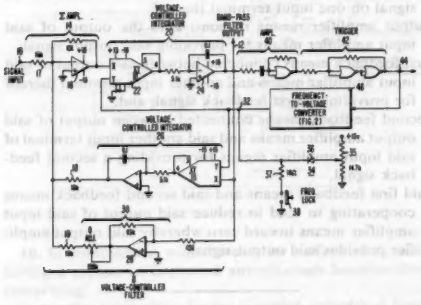
3,978,416

## FILTER WHICH TRACKS CHANGING FREQUENCY OF INPUT SIGNAL

Eldon Marvin Sutphin, Jr., Merrimack, N.H., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,034
Int. Cl.² H03B 1/04
U.S. Cl. 328—167 7 Claims




1. A band-pass filter having a pass band which tracks the changing frequency of an input signal, comprising

a voltage-controlled filter including a signal input terminal, a signal output terminal and a frequency control terminal,

a trigger circuit connected to said signal output terminal to translate the sine wave passed through said filter to a pulse wave,

a converter receptive to said pulse wave and operative repeatedly to translate the period between successive pulses to a frequency-representing voltage, and

means to apply said frequency-representing voltage to the frequency control terminal of said voltage-controlled filter.

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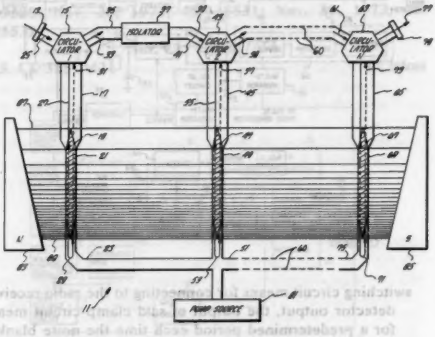
3,978,417

## REFLECTED-WAVE MASER

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Robert C. Clauss, La Crescenta, Calif.

Filed Feb. 12, 1975, Ser. No. 549,418
Int. Cl.² H01S 1/00, 1/02
U.S. Cl. 330—4 22 Claims




1. A traveling-wave maser, comprising:

a waveguide means having first and second ends, the second end of said waveguide means reflecting the traveling-wave signals traveling towards it;

a slow-wave maser structure located in said waveguide means between said first and second ends; and

means for introducing signals into and removing signal from said waveguide means at said first end.

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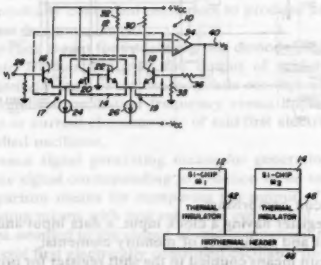
3,978,418

## LOW FREQUENCY ELECTRO-THERMAL FILTER

Wynand Jakobus Louw, Randburg, South Africa, assignor to University Patents, Inc., Stamford, Conn.

Filed Jan. 10, 1975, Ser. No. 539,975
Int. Cl.² H03F 1/32
U.S. Cl. 330—23 25 Claims




1. An electro-thermal filter comprising:

an electrical input terminal;

an isothermal header;

an insulating layer bonded to said header, said insulating layer having a predetermined thermal conductivity and thermal capacity;

a second layer bonded to said insulating layer, said second layer having a thermal conductivity and a thermal capacity higher than the thermal conductivity and thermal capacity of said insulating layer, the relative thermal conductivities and thermal capacities of said insulating layer and said second layer affecting the frequency characteristics of the electrothermal filter;

a differential heater electrically coupled to said input terminal having first and second heating members disposed on

said second layer, said heating members being differentially coupled to each other electrically for causing the amount of heat generated by one of said heating members to be increased and the amount of heat generated by the other of said heating members to be simultaneously decreased in response to a change in an electrical signal applied to said input terminal;

a differential heat sensor having first and second electrically coupled sensing members disposed on said second layer, said first sensing member being thermally coupled to said first heating member and said second sensing member being thermally coupled to said second heating member through said second layer;

an electrical output terminal; and

means electrically coupling said differential heat sensor to said output terminal for applying an output signal to said output terminal representative of the difference in temperature of said first and second heat sensing members.

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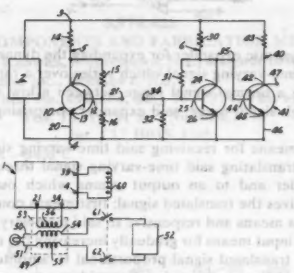
**3,978,419**

## TEMPERATURE AND SUPPLY VOLTAGE COMPENSATED AMPLIFYING DEVICE

**Robert P. Cummins, Brainerd, Minn., and Paul C. Hunt, Cass County, N. Dak., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jan. 6, 1975, Ser. No. 538,927**
**Int. Cl.² H03F 3/45**
**U.S. Cl. 330—30 D** **5 Claims**



1. A voltage amplifying device that is compensated to reduce variations in its output signal voltage due to changes in temperature or supply voltage provided by an electrical power source, which device comprises:

a first amplifier branch having a transistor with a collector terminal connected through a resistor to one side of said power source, an emitter terminal connnected to the opposite side of said power source by a conductive lead having substantially no resistance, and a base terminal connected to a first input signal terminal and also connected to said collector terminal by a feedback circuit; and

a second amplifier branch having a transistor with a collector terminal connected through a resistor to one side of said power source, an emitter terminal connected to the opposite side of said power source by a conductive lead having substantially no resistance, and a base terminal connected to a second input signal terminal and also connected to said collector terminal by a feedback circuit, whereby variations in the voltage potentials at the base terminals of the transistors in said amplifier branches that are due to variations in temperature and supply voltage offset one another to inhibit changes in the output signals at the collector terminals of said branches in response to said variations in temperature and supply voltage.

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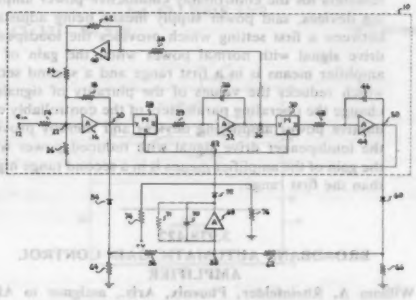
**3,978,420**

## SELF-TUNING FILTER

**L. Jubin Lane, Stuarts Draft, Va., assignor to General Electric Company, Salem, Va.**

**Filed Apr. 28, 1975, Ser. No. 572,433**
**Int. Cl.² H03F 1/36**
**U.S. Cl. 330—107** **12 Claims**



1. A self-tuning electronic filter comprising:

a. a tunable filter circuit responsive to an input signal for simulating a series resistance-inductance-capacitance circuit, said circuit providing voltages representative of the inductance and capacitance voltages of said simulated circuit and being responsive to the magnitude of an input control voltage to vary the resonant frequency of said filter circuit; and,

b. feedback means responsive to the voltages representing the inductance voltage and the capacitance voltage to produce said input control voltage to thereby vary the resonant frequency of said filter circuit.

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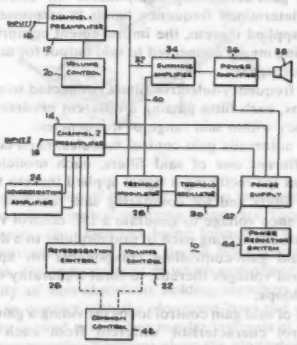
**3,978,421**

## ELECTRICAL MUSICAL INSTRUMENT AMPLIFIER HAVING IMPROVED TREMOLO CIRCUIT, IMPROVED REVERBERATION CONTROL, AND POWER REDUCTION CIRCUIT FOR DISTORTION MODE OPERATION

**Thomas A. Walker, Tustin, Calif., assignor to Music Man, Inc., Anaheim, Calif.**

**Filed Nov. 27, 1974, Ser. No. 527,754**
**Int. Cl.² H03F 3/68**
**U.S. Cl. 330—124 R** **12 Claims**



4. An amplifier for electrical musical instruments comprising:

amplifier means for amplifying a signal from an electrical musical instrument to provide a loudspeaker drive signal, the amplifier means comprising a plurality of controllably

conductive power amplifying devices and having a variable gain;

control means for varying the gain of the amplifier means; and

power supply means coupled to said amplifier means for supplying a plurality of signals to the controllably conductive power amplifying devices to establish operating parameters for the controllably conductive power amplifying devices, said power supply means being adjustable between a first setting which provides the loudspeaker drive signal with normal power when the gain of the amplifier means is in a first range and a second setting which reduces the values of the plurality of signals to change the operating parameters of the controllably conductive power amplifying devices and thereby provides the loudspeaker drive signal with reduced power when the gain of the amplifier means is in a second range higher than the first range.

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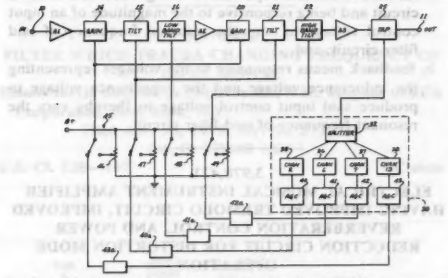
**3,978,422**

## BROADBAND AUTOMATIC GAIN CONTROL AMPLIFIER

**William A. Rheinfelder, Phoenix, Ariz., assignor to Alpha Engineering Corporation**

**Filed Feb. 28, 1975, Ser. No. 553,924**
**Int. Cl.² H03G *5/16***
**U.S. Cl. 330—132** **5 Claims**



1. In a wideband amplifier for amplifying signals over a range of frequencies applied to the input thereof and providing the amplified signals to the output thereof, said amplifier including gain-controlling components for controlling gain over predetermined frequency bands in response to control voltages applied thereto, the improvement comprising:

a. tapping means connected to said output for sampling said output signals;

b. four frequency-selective filters connected to said tapping means, each filter passing a different predetermined frequency within said range of frequencies;

c. four automatic gain control modules, each connected to a different one of said filters, each module including means for rectifying a signal applied thereto from one of said filters and for comparing said rectified signal to a reference voltage to generate a DC control voltage;

d. means connecting each of said modules to a different one of said gain-controlling components for applying said control voltages thereto, to form a plurality of gain control loops;

e. each of said gain control loops providing a gain-frequency control characteristic different from each other gain control loop; and

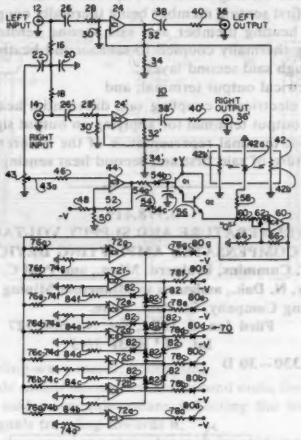
f. the first of said predetermined frequencies being near the highest frequency of said frequency range, the second of said predetermined frequencies being near the lowest frequency in said frequency range and the third and fourth predetermined frequencies each being intermediate said first and second predetermined frequencies.

**3,978,423**

## DYNAMIC EXPANDER

**Stephen Michael Bench, Lake Zurich, Ill., assignor to B-Cubed Engineering, Inc., Elgin, Ill.**

**Filed Aug. 19, 1974, Ser. No. 498,307**
**Int. Cl.² H03G *7/02***
**U.S. Cl. 330—141** **21 Claims**



1. A dynamic expander for expanding the dynamic range of a given time-varying signal which varies over a range of levels including a normal signal range between a low signal range and a high signal range, said expander comprising, in combination:

input means for receiving said time-varying signal, means for translating said time-varying signal through said expander and to an output means which output means receives the translated signal; first means coupled to said input means and responsive to said time-varying signal at said input means for gradually increasing the amplitude of said translated signal proportional to amplitude inreases in said time-varying signal at said input means when the level of said time-varying signal exceeds a predetermined high signal level and in accordance with a long time-constant relative to said time-varying signal, thereby to increase the dynamic range of said time-varying signal at said output means and wherein the rate of the increasing amplitude of said translated signal is substantially independent of abrupt changes in the amplitude of said time-varying signal; and, second means cooperating with said first means for gradually decreasing the amplitude of said translated signal relative to subsequent amplitude decreases in said time-varying signal at said input means, and in accordance with a time-constant which is substantially longer than said long time-constant, and wherein the rate of decrease of said translated signal is substantially slower than the rate of increase of said translated signal.

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**3,978,424**

## TWO-PHASE PULSE GENERATOR HAVING VOLTAGE CONTROLLED PULSE WIDTH

**Nobuhito Hobo, Inuyama, and Sumihiro Kaga, Inazawa, both of Japan, assignors to Nippondenso Co., Ltd., Japan**

**Filed May 30, 1975, Ser. No. 582,151**
**Claims priority, application Japan, June 25, 1974, 49-72936**
**Int. Cl.² H03K *3/02, 5/15***
**U.S. Cl. 331—45** **3 Claims**

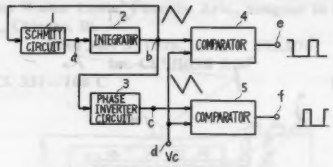
1. A two-phase pulse generating circuit comprising:

first circuit means for generating a first voltage which linearly increases and decreases in a predetermined cycle,

second circuit means connected to said first circuit means for inverting said first voltage to provide a second voltage,

means for generating a control voltage representing a condition to be controlled,

a first comparator having one input terminal connected to said first circuit means and the other input terminal connected to said control voltage generating means, and




a second comparator having one input terminal connected to said second circuit means and the other input terminal connected to said control voltage generating means, wherein two-phase pulses are generated on the output terminals of said first and second comparators.

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**3,978,425**

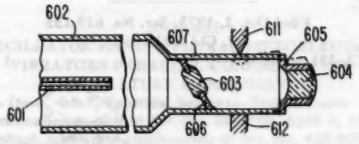
## LASER COMPONENTS AND FABRICATION METHODS

**Carl Harry Knowles, Moorestown, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.**

**Division of Ser. No. 490,204, July 19, 1974. This application Feb. 18, 1975, Ser. No. 550,747**

**Int. Cl.² H01S *3/08***

**U.S. Cl. 331—94.5 C** **5 Claims**




1. A method of manufacturing laser apparatus, comprising:

a. fabricating a laser tube enclosure having metallic portions at least at the prospective location of optical components;

b. completing the fabrication of said laser to integral structural completeness;

c. energizing said laser; and

d. deflecting said enclosure by applying pressure to metallic portions of said enclosure, thereby optimally aligning said optical elements, characterized in that said deflecting step comprises at least once

i. mounting said metallic portion on a metal processing vise having a movable top portion and an opposing fixed base member,

ii. applying pressure to said top portion to cause a crimp to be formed at the point of contact of said top portion against said metallic portion, correspondingly deflecting an optical component relative to the axis of said laser, while monitoring the coherent light output of said tube.

**3,978,426**

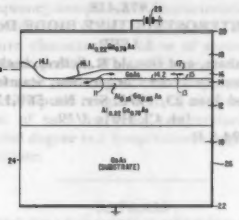
## HETEROSTRUCTURE DEVICES INCLUDING TAPERED OPTICAL COUPLERS

**Ralph Andre Logan; James Logan Merz, both of Morristown; Franz Karl Reinhart, Summit, and Harry Gregory White, Bernardsville, all of N.J., assignors to Bell-Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 11, 1975, Ser. No. 557,250**

**Int. Cl.² H01S *3/19***

**U.S. Cl. 331—94.5 H** **8 Claims**



1. A double heterostructure optical device comprising:

first and second wide bandgap layers,

a narrower bandgap region intermediate to and contiguous with said first and second layers, and adapted for the propagation of radiation therein, characterized in that

said region includes a passive optical waveguide layer having a bandgap less than that of said first and second layers and an active layer contiguous with said waveguide layer, said active layer having a bandgap less than that of said waveguide layer and terminating at one end within said device in a smooth taper effective to couple radiation from said active layer into said waveguide layer, said taper extending in the direction of radiation propagation.

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**3,978,427**

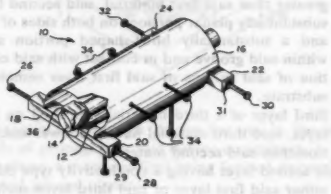
## ERBIUM LASER DEVICE HAVING NON-MASKING LASER ROD HOLDERS

**Norman R. Truscott, Whitinsville, Mass., assignor to American Optical Corporation, Southbridge, Mass.**

**Continuation of Ser. No. 370,249, June 15, 1973, abandoned. This application May 23, 1975, Ser. No. 580,509**

**Int. Cl.² H01S *3/093*, *3/02***

**U.S. Cl. 331—94.5 P** **7 Claims**




1. In a laser device of the type wherein an elongated laser rod and associated optical pumping means are disposed in an imaging cavity, the laser rod being formed of a glass host material into which have been doped laser active trivalent erbium ions, the improvement in which comprises:

a plurality of non-absorbent holding members being disposed in contact with the elongated laser rod circumferentially around said rod at regular intervals at each of at least two separate positions along the elongated laser rod firmly holding the rod in position, the holding members being formed of a glassy material which is transparent to pumping light energy from the optical pumping means at those wavelengths at which pumping energy is absorbed by the laser rod and being of such dimension so as to

transmit said pumping light energy to the portions of the rod which they contact;

means for cooperatively urging the holding members against the elongated laser rod to align and hold the laser rod within the imaging cavity; and

resilient means interposed between said holding members and said means for aligning said laser rod within the imaging cavity.

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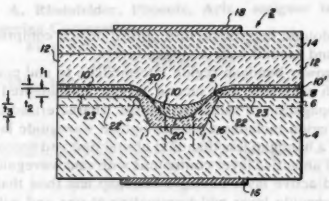
**3,978,428**

## BURIED-HETEROSTRUCTURE DIODE INJECTION LASER

**Robert D. Burnham, and Donald R. Scifres, both of Los Altos, Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed June 23, 1975, Ser. No. 589,120**
**Int. Cl. H01s *3/19***
**U.S. Cl. 331—94.5 H** **23 Claims**



**1.** A heterojunction diode laser comprising:

a substrate body having a surface with an elongated groove formed in said surface,

a first layer of a first material deposited on said surface, said first layer having a surface configuration remote from said surface of said substrate with a portion which is concave toward said substrate within a substantial portion of said groove,

a second layer of a second material deposited on said first layer, said second material having a index of refraction greater than said first material, said second layer having substantially planar portions on both sides of said groove and a substantially bowl-shaped portion substantially within said groove and in contact with said concave portion of said surface of said first layer remote from said substrate,

a third layer of a third material deposited on said second layer, said third material having a lower index of refraction than said second material,

said second layer having a conductivity type different from either said first layer or said third layer such that a first rectifying junction exist at the interface between said second layer and either said first layer or said third layer, and

means located on both sides of said groove formed in said surface of said substrate for restricting the flow of pump current to a path through said groove and through said bowl-shaped portion of said second layer when said rectifying junction is forward biased to thereby achieve population inversion in said bowl-shaped portion of said second layer such that light is produced by radiative recombination of the carriers in said bowl-shaped portion of said second layer with the light being guided by said first and third layers due to the lower index of refraction of said materials of said first and third layers relative to said material of said second layer.

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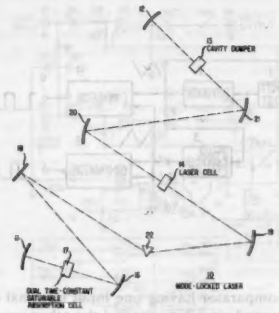
**3,978,429**

## MODE-LOCKED LASER

**Erich Peter Ippen, Red Bank, and Charles Vernon Shank, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 27, 1975, Ser. No. 580,549**
**Int. Cl.² H01S *3/098***
**U.S. Cl. 331—94.5 M** **12 Claims**




**1.** A source of coherent light pulses comprising a pair of reflective end members defining therebetween an optical resonant cavity, means for emitting coherent light within said cavity, and means for providing saturable absorption of the emitted light within said cavity, said means comprising first and second different absorption means, the recovery time of said first means being at least ten times faster than that of said second means, both recovery times being shorter than the round trip time of emitted light between the two reflective end members.

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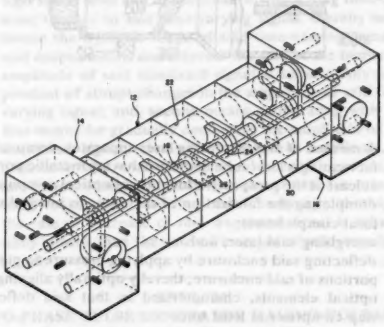
**3,978,430**

## SEGMENTED FLOW LASER CAVITY

**Russell W. Pierce, Ridgecrest, and Fred T. Rogers, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 2, 1975, Ser. No. 619,135**
**Int. Cl.² H01S *3/07***
**U.S. Cl. 331—94.5 D** **1 Claim**



**1.** An article of manufacture for use in the active region of a gas laser comprising:

a plurality of identical segments;

each segment comprising a generally rectangular solid having at least two planar parallel sides, a bore centrally located in said solid having an axis orthogonal to said parallel sides, two further bores in said solid equally spaced from said central bore and having axes parallel

thereto, a counterbore in the face of each parallel side along the axis of said central bore, each said parallel side being relieved between said counterbore and respective ones of said further bores so that when two said modular segments are combined with the axes of the respective bores in coincidence, a closed communicating passageway is formed between said central bore and one of said further bores.

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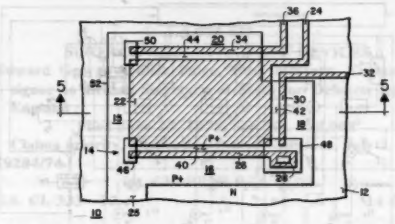
3,978,431

## TEMPERATURE COMPENSATED OSCILLATOR

William Walter Lattin, Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed July 3, 1975, Ser. No. 593,076
Int. Cl.² H03B 5/24
U.S. Cl. 331—108 C 10 Claims




1. A temperature compensated oscillator including a time constant generating circuit and a feedback circuit comprising:

impedance means coupled between a voltage conductor and a first node for supplying a current into said node, which current decreases as temperature increases; and

enhanced capacitor means forming the second element of the time constant coupled between said first node and a second voltage conductor for being charged through said impedance means, said enhanced capacitor having a capacitance which decreases as temperature increases, such that the RC time constant remains substantially fixed in value with variations in temperature.

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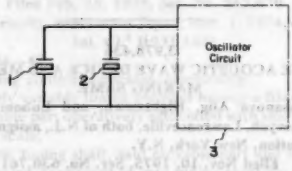
3,978,432

## OSCILLATOR HAVING PLURAL PIEZOELECTRIC VIBRATORS PARALLEL CONNECTED FOR TEMPERATURE COMPENSATION

Morio Onoe, 4-9-7, Taishido, Setagaya, Tokyo, Japan

Continuation-in-part of Ser. No. 564,945, April 3, 1975, abandoned, which is a continuation of Ser. No. 429,859, Jan. 2, 1974, abandoned. This application May 16, 1975, Ser. No. 578,057
Claims priority, application Japan, Dec. 29, 1972, 47-1217
Int. Cl.² H03B 5/32
U.S. Cl. 331—162 7 Claims




1. A piezoelectric oscillator which comprises a plurality of vibrator circuits each having therein a piezoelectric vibrator unit, said vibrator unit in each of said vibrator circuits having a reactance loss substantially equal to that of said vibrator unit in another said vibrator circuit, each said vibrator circuit being connected in parallel to one another and connected in parallel to a oscillator circuit so as to stabilize the oscillation frequency, said vibrator unit in one of said vibrator circuits having a frequency-temperature characteristic curve of third degree and said vibrator unit in each of all other said vibrator circuits having a frequency-temperature characteristic curve of second degree, said vibrator unit having a frequency-temperature characteristic curve of third degree having a flection point temperature relatively higher than an apex temperature of each said vibrator unit having a frequency-temperature characteristic curve of second degree, and said vibrator unit having a frequency-temperature characteristic curve of third degree and at least one of said vibrator units having a frequency-temperature characteristic curve of second degree being selected so that a portion of said frequency-temperature characteristic curve of third degree in a temperature range lower than said flection point temperature is compensated by means of a portion of said frequency-temperature characteristic curve of second degree in a temperature range lower than said apex temperature.

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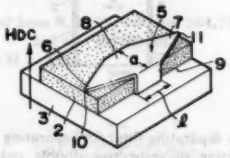
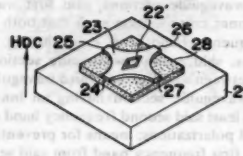
3,978,433

## MAGNETIC TRANSMISSION DEVICES USING THE EDGE-GUIDED MODE OF PROPAGATION

Yoshiyuki Naito; Kiyomichi Araki, both of Tokyo, and Tetsu Koyama, Yokosuka, all of Japan, assignors to Yoshiyuki Naito, Tokyo, Japan

Filed May 6, 1975, Ser. No. 574,939
Claims priority, application Japan, May 15, 1974, 49-58056; Nov. 20, 1974, 49-132690
Int. Cl.² H01P 1/36, 1/38
U.S. Cl. 333—1.1 10 Claims




1. A magnetic transmission device for use in the edge-guided mode of propagation, said device comprising:

a ground plane, a magnetic field being formed perpendicular to said ground plane;

a ferrite slab positioned on said ground plane; and

a conductor plate member positioned on said ferrite slab, said conductor plate member having:

first and second ports;

a first edge, extending from said first port to said second port forming means for concentrating microwaves inserted from said first port and propagating to said second port;

a second edge, extending from said second port to said first port, forming means for concentrating microwaves inserted from said second port and propagating in a direction toward said first port; and

means, positioned at an intermediate portion of said second edge, for short-circuiting said conductor plate member to said ground plane such that microwaves

inserted from said second port are absorbed within said ferrite slab and are not propagated to said first port.

3,978,434

## SYSTEM SEPARATING FILTER FOR SEPARATING FIRST AND SECOND DOUBLY POLARIZED FREQUENCY BANDS

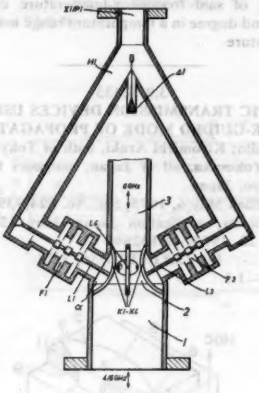
Günter Mörz, Ludwigsburg, and Stilianos Tokouzbalidis, Backnang, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Sept. 10, 1975, Ser. No. 611,974

Claims priority, application Germany, Sept. 10, 1974, 2443166

Int. Cl.² H01P 1/16, 1/20, 5/12

U.S. Cl. 333—6 12 Claims



1. A system separating filter for separating first and second signals consisting of respective doubly polarized first and second frequency bands of different frequencies, said filter comprising: first, second and third doubly polarizable series connected waveguide sections, said first waveguide section having an inner cross section such that both of said first and second frequency bands can exist therein with their dual polarizations, said second waveguide sections serving as a transition between said first and third waveguide sections, and said third waveguide section having an inner cross section such that at least said second frequency band can exist therein with its dual polarizations; means for preventing the propagation of said first frequency band from said second waveguide section into said third waveguide section and for forming standing waves of said first frequency band in said second waveguide section; first and second coupling means, each including a pair of coupling elements symmetrically disposed opposite one another in the walls of said second waveguide section and each associated with a separate one of the two directions of polarization, for coupling out the respective polarizations of the signals in said second waveguide section and for passing said first frequency band and blocking said second frequency band with the electrically effective reflection plane of said coupling means for said second frequency band effecting total reflection of said second frequency band; a first hybrid circuit means, having its inputs connected to the outputs of said first coupling means, for providing an output signal corresponding to one polarization of said first frequency band at its summing output; a second hybrid circuit means, having its inputs connected to the outputs of said second coupling means, for providing an output signal corresponding to the other polarization of said first frequency band at its summing output; and a polarization filter connected to said third waveguide section for providing separate output signals corresponding to the respective polarizations of said second frequency band.

3,978,435

## DIGITAL EQUALIZER FOR DATA-TRANSMISSION SYSTEM

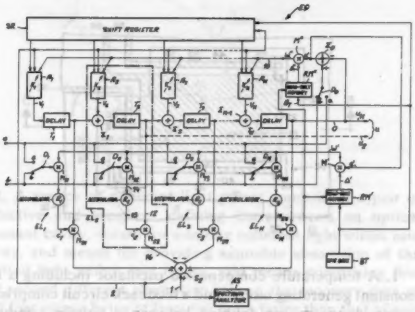
Angelo Luvison, Turin, and Giancarlo Pirani, Genoa, both of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

Filed Apr. 28, 1975, Ser. No. 572,335

Claims priority, application Italy, Apr. 26, 1974, 68312/74

Int. Cl.² H04B 3/04

U.S. Cl. 333—18 10 Claims



1. An equalizer for digital messages insertable between a transmission channel and a load, comprising:

a data input for incoming pulses;

a multiplicity of branch leads;

adjustable weighting means in each of said branch leads;

summing means connected to said data input and to said branch leads for algebraically combining an incoming data pulse with weighted pulses from said branch leads to form an updating signal fed in parallel to said branch leads for yielding said weighted pulses;

synthesizing means connected to said branch leads for additively combining said weighted pulses into a composite signal;

comparison means connected to a source of reference signals and to said synthesizing means for deriving an error signal from said reference and composite signals; and

arithmetic means connected to said comparison means for translating said error signal into a control signal fed to said weighting means for adjusting same to vary the magnitude of said weighted pulses in a sense tending to reduce said error signal.

3,978,436

## SURFACE ACOUSTIC WAVE DEVICE AND METHOD OF MAKING SAME

Roger Casanova Alig, Hightstown, and Lubomyr Stephen Onyshkevych, Lawrenceville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,761

Int. Cl.² H03H 9/04, 9/14, 9/30; H01L 41/10

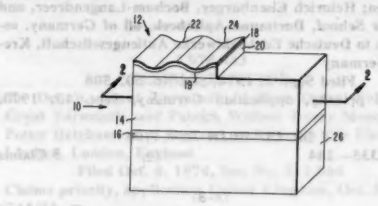
U.S. Cl. 333—30 R 9 Claims

1. A surface acoustic wave device comprising:

a piezoelectric body; and

a transducer on one surface of said piezoelectric body, said transducer having an electrically insulating body on said

piezoelectric body with a surface relief pattern on a surface opposite said piezoelectric body, a layer of conductive material on said surface, having the surface relief pattern thereon.



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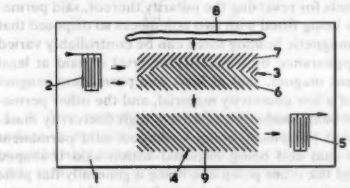
## 3,978,437
## SURFACE ACOUSTIC WAVE DEVICES

**Edward George Sydney Paige, West Malvern, England, assignor to British Secretary of State for Defence, London, England**

**Filed June 27, 1975, Ser. No. 590,908**
**Claims priority, application United Kingdom, July 2, 1974, 29284/74**
**Int. Cl.² H03H** *9/26, 9/30*
**U.S. Cl. 333—72** **11 Claims**



1. A surface acoustic wave device comprising a substrate able to support surface acoustic waves, a transducer for launching surface acoustic waves in a track on the substrate, a transducer for receiving surface acoustic waves from a track on the substrate, the substrate having piezo-electric regions at least at the transducers, and a first reflective array structure having two sets of varying length reflecting elements arranged across a surface acoustic wave track, one set angled to reflect some of the surface acoustic waves in the track into one direction and the other set angled to reflect some of the surface acoustic waves in the track into another direction.

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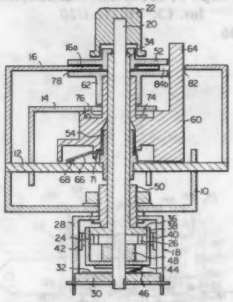
## 3,978,438
## TUNING CONTROL APPARATUS

**Masatsugu Aoki, Soma, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Feb. 25, 1975, Ser. No. 553,070**
**Claims priority, application Japan, Mar. 1, 1974, 49-24580**
**Int. Cl.² H03J** *5/00*
**U.S. Cl. 334—47** **3 Claims**

1. A tuning control apparatus, comprising:
a rotatably variable tuning element having a fixed part and a movable part operatively associated with said fixed part;
a tuning scale;
a rotatable tuning shaft, said movable part and said tuning scale being connected to said tuning shaft for rotation;
a rotary switch having a fixed contact and a movable contact operatively associated with said fixed contact;
a switch position indicator;
a rotatable switch shaft, said movable contact and said switch position indicator being connected to said rotatable switch shaft;
said switch shaft being formed with a bore and said tuning shaft extending through said bore; and



a fixed support member having position indications, both said tuning scale and said switch position indicator being rotatably associated with the position indications on said fixed member.

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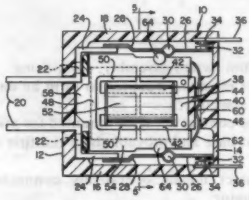
## 3,978,439
## RELAY CONSTRUCTION

**Arthur J. Thomson, 36 Larchwood Drive, Cumberland, R.I. 02864**

**Filed June 9, 1975, Ser. No. 584,719**
**Int. Cl.² H01H** *50/20*
**U.S. Cl. 335—131** **20 Claims**

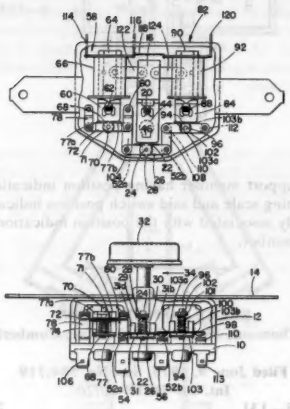


1. A relay comprising a flat, rectangular, dielectric housing having front, rear, and side walls, a pair of contact prongs extending forwardly through said front wall, a pair of contact arms extending rearwardly through said rear wall, a fixed contact element in said housing at the inner end of each of said contact arms, a movable contact element adjacent each of said fixed contact elements with a narrow gap therebetween, each said movable contact elements being mounted on a movable conductor arm, each movable conductor arm being mounted on the inner end of one of said contact prongs, a coil mounted in said housing, a fixed armature at the rear end of said coil, a movable armature at the front end of said coil, means for biasing said movable armature away from said fixed armature, said movable armature moving rearwardly into contact with said fixed armature when said coil is energized, and means associated with said movable armature for moving said movable conductor arms to close the gap between said contact elements when said coil is energized, said biasing means moving said movable armature away from said fixed armature to allow said conductor arms to move said contact elements apart when said coil is de-energized.

## 3,978,440
## PUSH TO START DUAL RELAY

Robert E. Prouty, and Cecil A. Lambert, both of Logansport, Ind., assignors to Essex International, Inc., Fort Wayne, Ind.

Filed Sept. 9, 1974, Ser. No. 504,436
Int. Cl.² H01H 3/20
U.S. Cl. 335—186 7 Claims

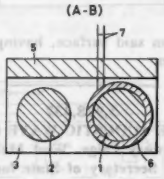


1. A push button switch assembly, comprising:
base and cover members adapted to form an enclosure for said switch assembly;
a flat elongated contact actuator mounted for pivotal movement on said base and movable between first and second positions;
electrical contact means operatively connected to said contact actuator;
spring means for biasing said contact actuator to said first position;
a push button shaft having a first portion slidably mounted in said cover member;
a circular aperture in said contact actuator;
a notch in said circular aperture;
said push button shaft having a second portion which is circular in cross section and which is slidable in said circular aperture;
spring means for biasing said push button shaft to an unactuated position;
a first ear on said push button shaft extending from said second portion and adapted to engage a first side of said contact actuator when said push button shaft is depressed to move said contact actuator to said second position;
a second ear extending from said second position and disposed adjacent the second side of said contact actuator;
interlocking means for holding said contact actuator in said second position; and
said second ear being adapted to align with and pass through said notch when said push button shaft is rotated to a first position and being adapted to engage the second side of said contact actuator when said push button shaft is rotated to a second position.

## 3,978,441
## PERMANENT MAGNET HOLDING SYSTEM

Gert Sobottka, Cappenberg; Peter Pagenkemper, Dortmund-Schuren; Heinrich Eisenburger, Bochum-Langendreer, and Werner Schoof, Dortmund-Aplerbeck, all of Germany, assignors to Deutsche Edelstahlwerke Aktiengesellschaft, Krefeld, Germany

Filed Sept. 5, 1974, Ser. No. 503,508
Claims priority, application Germany, Sept. 13, 1973, 2346042
Int. Cl.² H01H 7/04, 7/06
U.S. Cl. 335—284 5 Claims

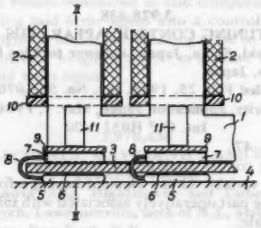



1. A permanent magnet holding system comprising a plurality of permanent magnets disposed so that their directions of magnetization are parallel and offset from each other, an electromagnetic coil associated with at least one of said permanent magnets for reversing the polarity thereof, said permanent magnets being fitted with two polepieces so disposed that the external magnetic holding force can be controllably varied to total disappearance by a polarity reversal of said at least one permanent magnet, said at least one permanent magnet being made of a low coercivity material, and the other permanent magnets being made of a relatively high coercivity material one of said polepieces being U-shaped, said permanent magnets and said coil being disposed within said U-shaped polepiece, and the other polepiece being a generally flat plate overlying said magnets and said coil and disposed between the legs of said U-shaped polepiece.

## 3,978,442
## CLAMPING OF TRANSFORMER WINDINGS BY MEANS OF HYDRAULIC POWER AMPLIFIERS

Erich Spicar, Ludvika, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Oct. 14, 1975, Ser. No. 622,370
Claims priority, application Sweden, Nov. 8, 1974, 7414034
Int. Cl.² H01F 27/26, 27/30
U.S. Cl. 336—92 2 Claims



1. In a transformer having a core (1) and windings (2), and having means supporting the core, means for hydraulically clamping the transformer windings comprising at least one hydraulic pressure-generating box (5) on which the supporting means rests, at least one clamping box (7) arranged between the lower ends of the windings and the supporting

means, and means joining the pressure-generating boxes (5) and clamping boxes (7) transmitting hydraulic pressure between the boxes.

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3,978,443

## FUSIBLE RESISTOR

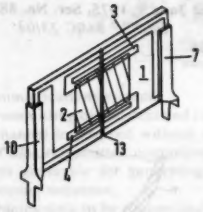
Colin Dennis, Great Yarmouth; Arthur Denys Holt, Near Great Yarmouth, and Patrick William Henry Moore, Near Potter Heigham, all of England, assignors to Erie Electronics Limited, London, England

Filed Oct. 4, 1974, Ser. No. 512,064

Claims priority, application United Kingdom, Oct. 5, 1973, 46744/73

Int. Cl.² H01C 1/14

U.S. Cl. 338—309 10 Claims




1. A fuse comprising a substrate, two terminal paths of conductive material formed on said substrate, and a resistor carried by said substrate and extending between said terminal paths, said resistor constructed to form a line of maximum thermal stress in said substrate upon a current passing through said resistor which line of maximum thermal stress in turn defines an expected line of fracture of said substrate such that the substrate fractures nearly along said expected line of fracture when the rated wattage for the fuse is exceeded, wherein at least one of said terminal paths includes a first portion adjacent and contacting said resistor and a second portion spaced from said first portion so that an area of the substrate separates said first and second portions of said terminal path, and wherein said expected line of fracture respectively crosses said first portion of said last mentioned terminal path, said area of said substrate and said second portion of said last mentioned terminal path.

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3,978,444

## SEAFLOOR MAPPING SYSTEM

Robert D. Hitchcock, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 30, 1975, Ser. No. 582,481

Int. Cl.² G01S 9/66, 7/60

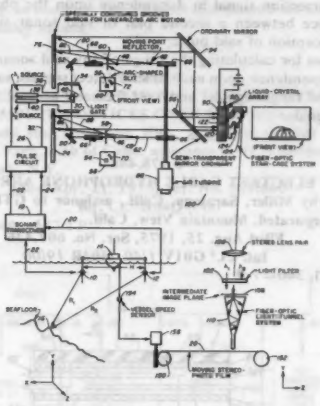
U.S. Cl. 340—3 F 12 Claims

1. A seafloor mapping system for providing a stereo-film of the coordinates of the seafloor being mapped from first and second echo ranges produced by respective first and second rotating, pulsed, side-looking sonar transducers comprising:

a. means for creating a point of light with respect to first and second center reference points on said means such that first and second vectors are formed therebetween, said first and second vectors being functionally related to said first and second echo ranges, respectively;

b. said stereo-film having a centerline along its longitudinal axis; and

c. means for guiding said point of light onto said stereo-film exposing said film at a point on either side of said centerline, the perpendicular distance from each said exposure point to said centerline being proportional to,the vertical



distance from said first and second transducer to the seafloor surface being mapped.

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3,978,445

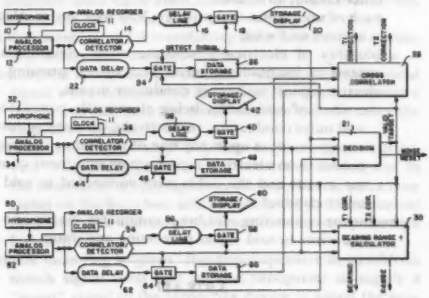
## ASW INTERCEPT LOCALIZATION SONAR

Gerald F. Gravett, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 19, 1974, Ser. No. 525,253

Int. Cl.² G01V 1/00

U.S. Cl. 340—6 R 8 Claims



1. A device for automatically detecting and localizing sources of high frequency sonar pulses in real time both in range and bearing, comprising:

a plurality of hydrophones colinearly spaced apart parallel to the major dimension of a broad based platform for reception of narrowband sonar signals;

a plurality of auto correlation means each corresponding to a different one of said hydrophones and continuously producing detect signals upon reception of said sonar signals within said narrow-band at the corresponding one of said hydrophones by convoluting said sonar signal with its mirror image;

logic means for generating a bearing signal in dependence upon the delay between the initiation of a first pair of said detect signals, for generating a pulse upon a favorable comparison of the bearing signal to a threshold value, for generating a first difference signal in dependence upon the delay between the initiation of a second pair of said detect signals, for generating a range signal in dependence upon the difference between the bearing signal and the first difference signal;

cross correlation means for generating a first correction signal in dependence upon the phase different between a first pair of said sonar signals and for generating a second correction signal in dependence upon the phase difference between a second pair of said sonar signal upon reception of said pulse; and

means for calculating the range of any said sonar source in dependence upon each of said detect signals, said bearing and range signals, and said first and second correction signals.

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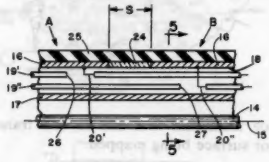
**3,978,446**

## ELECTRET CABLE HYDROPHONE ARRAY

**G. Kirby Miller, Saratoga, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.**

**Filed Aug. 25, 1975, Ser. No. 607,436**
**Int. Cl.² G01V** *1/40;* **H04R** *19/00*
**U.S. Cl. 340—7 R** **10 Claims**




1. A hydrophone line array adapted to be towed by a ship and connectable to signal processing apparatus on said ship comprising

inner conductor means extending along the array axis for the length of the array,

a plurality of cables disposed around the exterior of said inner conductor means,

each of said cables comprising a lead wire and an electret around said wire,

a plurality of electrically separate outer conductors arranged in longitudinal series and tightly pressing said electret against said inner conductor means,

the wires of said cables being electrically connected to said outer conductors, respectively, whereby acoustical energy incident upon any one of said outer conductors produces an electrical signal across said inner conductor means and the cable wire connected to said one outer conductor, and

means for connecting said inner conductor means and said cable wires to said signal processing apparatus.

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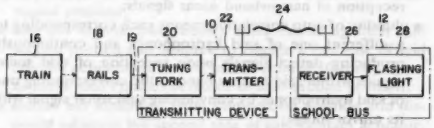
**3,978,447**

## SAFETY TRANSMITTING DEVICE

**Frederick M. Bankes, Wyoming, Pa., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed July 1, 1975, Ser. No. 592,274**
**Int. Cl.² G08G** *1/00;* **B60T** *17/18*
**U.S. Cl. 340—33** **4 Claims**




1. A safety transmitting device for warning motor vehicle approaching a railroad crossing of the simultaneous approaching of a train along the tracks, which comprises:

a. a tuning fork adapted to mechanically communicate with said tracks, a vibration of said tracks due to said train moving on said tracks introducing a vibration in said tuning fork, said tuning fork emitting sound waves therefrom and said tuning fork adapted to be located at a predetermined distance from said crossing;

b. a transmitter unit located next to said tuning fork for converting said sound waves from said fork to electromagnetic waves and transmitting said electromagnetic waves therefrom;

c. a receiver unit adapted to be received in said motor vehicle and to receive said electromagnetic waves;

d. a flashing light unit adapted to be received in an interior of said motor vehicle just forwardly of a driver; and

e. an electric circuit of a battery of said motor vehicle, said flashing light and said receiver unit.

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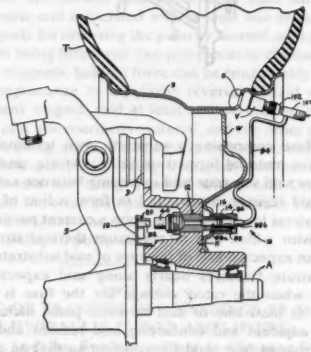
**3,978,448**

## VEHICLE-TIRE-AIR-PRESSURE-SENSING-AND-INDICATING DEVICE

**Otto Zoltan Vago, Burns, Tenn., assignor to Scovill Manufacturing Company, Waterbury, Conn.**

**Filed June 9, 1975, Ser. No. 585,088**
**Int. Cl.² B60C** *23/04*
**U.S. Cl. 340—58** **8 Claims**

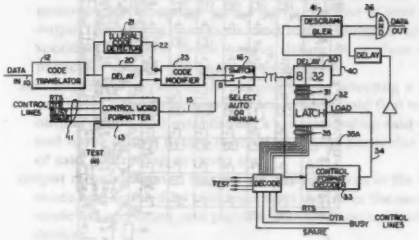


1. In a vehicle-tire-air-pressure-sensing-and-indicating device having magnetic-field sensitive switch means mounted on the vehicle adjacent the wheel connected through electrical means to indicating means within the vehicle, magnet means, mounting means on the wheel assembly mounting the magnet means for movement toward and away from the switch means in directions parallel to the axis of the wheel, the mounting means comprising a bellows having one end fixedly supported on the wheel assembly, the other end carrying the magnet means, a id housing means surrounding the bellows and connecting means connecting the housing means to the tire; the improvement wherein the bellows has a central bore at one end closed by a ball member to seal the bellows and the bellows is formed with an internal axially disposed elongate stop means limiting the collapse of the bellows, the housing means comprises an elongate, generally cylindrical tubular element disposed in a circular opening in the wheel structure and lying in a disposition parallel to the axis of the wheel and the connecting means includes tube means connected to the outer portion of the housing means and extending to the usual fill valve fitting of the tire on the wheel.

## 3,978,449
## METHOD AND APPARATUS FOR IN-BAND SIGNALLING IN DATA TRANSMISSION

**Ray W. Sanders, Los Angeles; Neil T. Keyes, Palos Verdes; Stephen W. Harting, Los Angeles, and Donald J. Mueller, Hawthorne, all of Calif., assignors to Computer Transmission Corporation, El Segundo, Calif.**

**Filed Jan. 27, 1975, Ser. No. 544,207**
**Int. Cl.² H03K 5/18; H04L 1/08**
**U.S. Cl. 340—146.1 BA** **17 Claims**




1. In a data communications system,

apparatus for transmitting digital data and control signals on a common channel intermixed without restriction as to the format of data transmitted comprising;

a multi-stage bit generator for generating a train of bits having a repeating sequence;

means for combining data to be transmitted with the output of said bit generator to modify said data as a function of said bit sequence;

a control code detector for detecting a predetermined number of bit combinations indicative of control information;

means for applying the output of said combining means to the input of said control code detector;

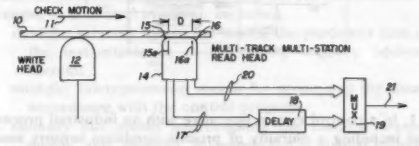
means responsive to the detection of a control code in said output for modifying said output; and

means for selectively introducing control codes and the output of said last means into a transmission channel.

## 3,978,450
## IMAGE CHARACTER READER SYSTEM

**Medford Duane Sanner, Irving, Tex.; Jim O. Lafevers, Richardson, Tex., and Sauas Mirci, Mission Viejo, Calif., assignors to Recognition Equipment Incorporated, Irving, Tex.**

**Filed May 30, 1974, Ser. No. 474,383**
**Int. Cl.² G06K 9/12**
**U.S. Cl. 340—146.3 C** **6 Claims**




1. A reading system for sensing magnetic characters on a document transport past a read station which comprises:

a. a first set of read head elements each of a selected dimension spaced laterally one from another less than the selected dimension across a path traversed by said document at said read station to sense magnetic material on a first set of spaced, parallel tracks,

b. a second set of read head elements each of a selected dimension spaced laterally one from another less than the selected dimension across said path downstream from said first set in a partially overlapping relation with respect to said first set to sense magnetic material along parallel tracks intermediate and in part common to said first set of tracks, and having a center line offset from the center line of the next read head of said first set less than the selected dimension,

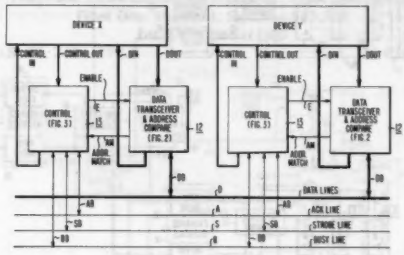
c. means to delay signals from said first set, and

d. means to combine signals from said second set and from said delay means.

## 3,978,451
## CONTROLLING COMMUNICATIONS BETWEEN COMPUTER DEVICES OVER COMMON BUS

**Roy Atsushi Ito, Woodland Hills, and Gary Arthur Jones, Canoga Park, both of Calif., assignors to RCA Corporation, New York, N.Y.**

**Filed Apr. 21, 1975, Ser. No. 569,860**
**Int. Cl.² H04Q 9/00**
**U.S. Cl. 340—147 LP** **4 Claims**




1. A system for controlling communications between a plurality of devices via a common bus which includes a multiconductor data bus, and a "busy" bus, comprising a plurality of interface units each associated with a respective device, each interface unit including

a data transceiver for transferring data between the respective device and the data bus,

an address recognizer providing an "address match" output signal when receptive to an address from the respective device and said data bus which matches the address of the respective device,

means including a "busy" flip-flop responsive to a bus access "request" signal from the respective device, and to the absence of a busy signal on the busy bus, to put a busy signal on the busy bus, and to enable the data transceiver to connect the address of the respective device to the data bus, and

means including a "grant" flip-flop responsive to an address match signal from said address recognizer to supply a "grant" signal to the respective device to signal the seizing of the bus by the respective device, and to continue the supplying of a busy signal to the busy bus from said "busy" flip-flop.

## 3,978,452
## SYSTEM AND METHOD FOR CONCURRENT AND PIPELINE PROCESSING EMPLOYING A DATA DRIVEN NETWORK

**Robert Stanley Barton, Palo Alto, Calif.; Alan Lynn Davis, Salt Lake City, Utah; Erwin Arthur Hauck, Arcadia, Calif.; Don Martin Lyle, and Lloyd Drayton Turner, both of Huntington Beach, Calif., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed Feb. 28, 1974, Ser. No. 447,040**
**Int. Cl.² G06F 3/00**
**U.S. Cl. 340—172.5** **10 Claims**

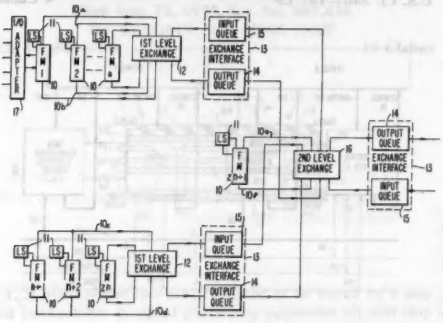
1. A data driven information processing system for handling variable length data segments some of which contain an operator code but are devoid of a sufficient number of operands required for the specified operation, some of said data seg-

ments not containing an operator code but containing at least one operand which requires subsequent fetching of an operator code in order to process said at least one operand, said system comprising:

a plurality of programmable units;

means interconnecting said programmable units for serial data transfer therebetween of different variable length data segments, each of said variable length data segments being preceded by a character indicating segment beginning, each segment being followed by a character indicating segment ending; and

a plurality of storage units, one for each programmable unit, each storage unit being coupled to its respective programmable unit for serial data transfer of at least one of said variable length data segments which contains an operator code but not a sufficient number of operands;




each of said programmable units including an input buffer means coupled to said interconnecting means to receive a said variable length data segment from another programmable unit, a segment beginning character detection means and a segment ending character detection means, each detection means being coupled to said input buffer means to determine the beginning and ending of the serial transfer of said data segments;

each programmable unit further including a logic unit to perform operations on different data segments, said input means coupling said interconnection means to said logic unit to transfer said different data segments to said logic unit, and a control unit coupled to said input buffer means and said respectively coupled storage unit to access said storage unit to fetch an operator code in response to the receipt of a said data segment from said interconnection means, which said data segment contains only at least one operand and thus requires said fetching of said operator code.

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**3,978,453**

## INPUT KEYBOARD APPARATUS FOR AN ELECTRONIC COMPUTER

**Gastone Garziera, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy**

**Filed Apr. 8, 1974, Ser. No. 459,159**

**Claims priority, application Italy, Apr. 24, 1973, 68155/73**

**Int. Cl.² G06F** *3/02*

**U.S. Cl. 340—172.5** **15 Claims**

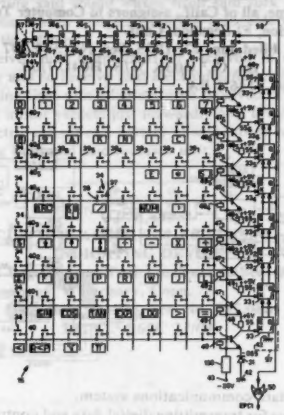
1. An input keyboard apparatus for an electronic computer comprising:

a set of information input keys, each key operable for entering relevant information and wherein said keys are arranged in a predetermined progressive order;

recording means actuatable upon operation of each key to generate at least one indicating signal corresponding to the operated key;

a shift register conditionable by said recording means for recording said indicating signal in a position in the shift register corresponding to the position of the operated key;

shift command means for repeatedly effecting said shift register to shift said indicating signal until the recorded indicating signal issues from the shift register; and



counting means for counting the number shifts of said indicating signal effected by said shift command means in said shift register thereby producing relevant information in the form of a number corresponding to the progressive order of said operated key.

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**3,978,454**

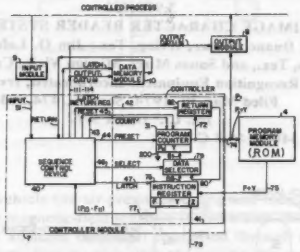
## SYSTEM AND METHOD FOR PROGRAMMABLE SEQUENCE CONTROL

**Frank G. Willard, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 20, 1974, Ser. No. 481,267**

**Int. Cl.² G06F** *9/16, 13/08;* **G05B** *11/32, 19/24*

**U.S. Cl. 340—172.5** **6 Claims**




1. In a control system operative with an industrial process and including a plurality of process condition sensors associated with process controlling devices, the combination of:

first memory means having stored therein a plurality of first output governing functions of input data representing the status of said process condition sensors for providing first mode output data corresponding to predetermined ones of said first output governing functions and pertaining to each of said process controlling devices;

second memory means having stored herein a single second output governing function of input data representing the status of selected process condition sensors and of said first mode output data for providing second mode output data pertaining to each of said process controlling devices;

timing means for generating a synchronizing signal;

counter means controlled by said synchronizing signal and operative with said first and second memory means

sequencer means operative with said first memory means when said counter means is in a first mode to generate said first mode output data in relation to said first memory means, and operative with said second memory means when in a second mode to generate said second mode output data in relation to said second memory means;

said sequencer means in the first mode selecting a predetermined corresponding first set of input data from said sensors when operative with a particular one of said first output governing functions and establishing a corresponding said first mode output datum in relation to a particular one of said controlling devices;

said sequencer means in the second mode selecting a second set of input data from said sensors and said first mode output datum and establishing a corresponding said second mode output datum in relation to said particular one of said controlling devices; and

output means inhibited by said sequencer means in the first mode and enabled by said sequencer means in the second mode for activating said particular one of said controlling devices.

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## 3,978,455

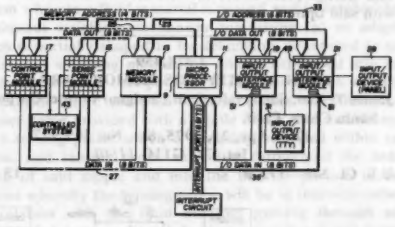
## I/O STRUCTURE FOR MICROPROCESSOR IMPLEMENTED SYSTEMS

**John G. Valassis, Des Plaines, and James R. Holden, Chicago, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Sept. 9, 1974, Ser. No. 504,599**

**Int. Cl.[2] G06F** *3/04, 9/10, 9/12*

**U.S. Cl. 340—172.5** **4 Claims**



1. An expandable modular electronic data processing system for processing data in accordance with instructions arranged as a control program, including,

modular memory means for storing the processed data and the instructions at corresponding memory addresses therein;

modular microprocessor means for processing the data in accordance with the control program;

memory bus means intercoupling the modular memory means and modular microprocessor means including memory address bus means and memory data bus means;

input/output bus means connected to the modular microprocessor means including input/output address bus means and input/output data bus means;

a plurality of input/output interface modules, each having a corresponding input/output device associated therewith and each connected to the input/output bus means for transmitting data generated by the corresponding input-/output device to the modular microprocessor means for processing and for transmitting processed data generated by the modular microprocessor means to the corresponding input/output device, each input/output interface module including control means for controlling the operation of the corresponding input/output device in response to control data; characterized in that:

each input/output interface module includes a first addressable register means having a first unique memory address associated therewith and is connected to said memory bus means for receiving and storing control data transmitted by the modular microprocessor means on the memory data bus means in response to the first unique memory address being transmitted by the modular microprocessor means on the memory address bus means, the control data stored in the first addressable register means being utilized by the control means for controlling the operation of the input/output device associated therewith.

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## 3,978,456

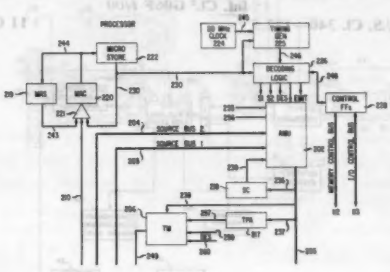
## BYTE-BY-BYTE TYPE PROCESSOR CIRCUIT

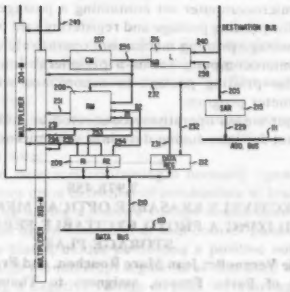
**John Christian Moran, Broomfield, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 16, 1974, Ser. No. 533,339**

**Int. Cl.[2] G06F** *13/00*

**U.S. Cl. 340—172.5** **20 Claims**





1. In a processor in which data words are received from and transmitted to an I/O system in a parallel bit format with each word comprising a plurality of multibit bytes, said processor being arranged to process each received word on a byte-by-byte basis, said processor comprising, an arithmetic unit (AMU), a plurality of source buses connected to inputs of said AMU, a destination bus connected to an output of said AMU, source circuits and destination circuits wherein some of said circuits are able to store a plurality of words, gating means effective on a processor operation for connecting a different selected one of said source circuits to each of said source buses, further gating means effective on said operation for connecting any selected one of said destination circuits to said destination bus, control means effective on said operation for applying a word byte-by-byte from each of said selected source circuits to said AMU via said source buses, means effective on said last named operation whereby one of said

applied words received by said AMU is a specified one of a plurality of words in one of said selected source circuits whenever said one source circuit has a plural word storage capacity, said AMU being effective for processing said received words to produce an output word, and means including said control means for extending said output word from said AMU over said destination bus into said selected destination circuit byte-by-byte, said last name means being effective to enter said output word into a specified one of a plurality of word locations of said selected destination circuit whenever said selected destination circuit is a circuit having a plural word storage capacity, each of said word locations comprising a plurality of byte storage locations.

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**3,978,457**

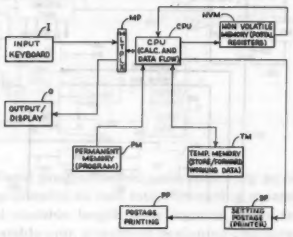
## MICROCOMPUTERIZED ELECTRONIC POSTAGE METER SYSTEM

**Frank T. Check, Jr., Orange; Alton B. Eckert, Jr., Norwalk, and Joseph R. Warren, Stamford, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Dec. 23, 1974, Ser. No. 536,248**

**Int. Cl.² G06F *1/00***

**U.S. Cl. 340—172.5** **11 Claims**




**1.** A micro computerized postage meter, comprising:

a microcomputer set containing a postage meter program for printing postage and registering said printed postage;

a postage printing mechanism operatively connected to the microcomputer set as a peripheral component thereof, for printing postage in accordance with said postage meter program;

input means operatively connected to said microcomputer set for introducing data into said microcomputer set.

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**3,978,458**

## SELECTIVELY ERASABLE OPTICAL MEMORY SYSTEM UTILIZING A PHOTO EXCITABLE FERROELECTRIC STORAGE PLATE

**Marie Vergnolle; Jean Marc Rouchon, and Francois Micheron, all of Paris, France, assignors to Thomson-CSF, Paris, France**

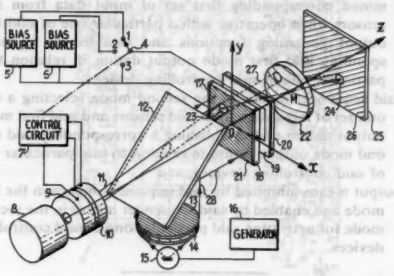
**Filed Aug. 16, 1974, Ser. No. 498,218**

**Claims priority, application France, Aug. 21, 1973, 73.30303**

**Int. Cl.² G11C *11/22, 11/42***

**U.S. Cl. 340—173.2** **14 Claims**

**1.** Selectively erasable optical memory system for storing erasing and displaying data in form of at least one light trace, said system comprising: a storage plate having two substantially parallel major faces, electrical biasing means arranged for providing within said storage plate an external electric field having an orientation substantially parallel to said major faces, optical means provided for respectively recording and erasing said data through the selective illumination of said storage plate along one of said major faces, read-out means arranged for optically displaying the data stored in said storage plate, and control means for simultaneously controlling said electrical biasing means and said optical means to successively effect storage erasure and display of said data; said storage plate being cut from a photo excitable ferroelectric material whose birefringent property is a quadratic function of the applied electric field; said read-out means comprising a source of radiant energy for illuminating said storage plate along one of said major faces, polarizer means positioned between said source and said storage plate, and analyser means arranged for receiving from said storage plate said radiant energy; said optical means comprising a further source of radiant energy selectively illuminating said storage plate in




the course of the recording and erasing of said data; said electrical biasing means comprising switching means actuated by said control means for setting the value of said external electric field to a predetermined value in the course of the storage of said trace for forming in the portion of said storage plate receiving said selective illumination of photo-induced electric field balancing said external electric field; said switching means making the value of said external field to reduce to zero for causing the erasure of data stored in any portion of said storage plate under the selective re-illumination thereof with said optical means.

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**3,978,459**

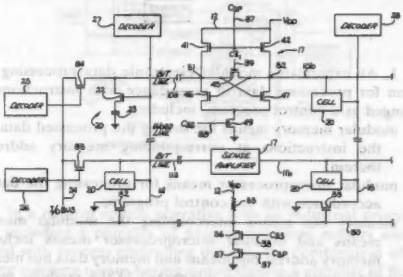
## HIGH DENSITY MOS MEMORY ARRAY

**James T. Koo, Sunnyvale, Calif., assignor to Intel Corporation, Santa Clara, Calif.**

**Filed Apr. 21, 1975, Ser. No. 569,927**

**Int. Cl.² G11C *11/40***

**U.S. Cl. 340—173 R** **15 Claims**




**1.** In an MOS dynamic RAM employing a plurality of sense lines coupled to a plurality of sense amplifiers an improvement comprising:

at least a first transistor in each of said sense amplifiers, coupled between a source of potential and said sense line; and

signal generation means coupled to said sense amplifiers for causing said first transistor in each of said sense amplifiers to sequentially charge said sense line and operate as a load in said sense amplifier;

whereby a single transistor performs both a precharging function and operate as a load in the sense amplifier.

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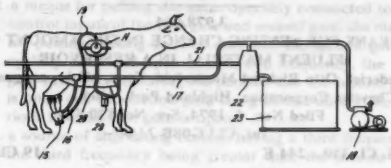
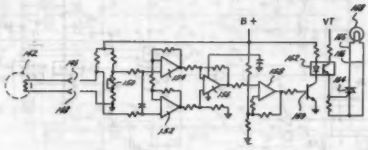
3,978,460

## TEMPERATURE INDICATING DEVICE FOR FLUIDS

Burton Kent Jaquith, Fort Lauderdale, Fla., assignor to Technical Industries, Inc., Fort Lauderdale, Fla.

Filed Mar. 28, 1975, Ser. No. 563,187
Int. Cl.[2] A01J 7/00; G08B 21/00
U.S. Cl. 340—227 R 18 Claims





1. A temperature indicating device for use with a conduit system wherein a fluid material is moved and is weighed by a continuous weighing mechanism comprising (a) an adapter which is partially shaped to be detachably connected to said continuous weighing mechanism and incorporated into said conduit system on that portion of said continuous weighing mechanism where the fluid material passes therefrom, said adapter being provided with a nipple in the side wall thereof; (b) a sensing probe which is slideably mounted within said nipple, said sensing probe extending throughout the entire length of said nipple and into the interior portion of said adapter whereby the sensing probe will be in thermoconducting relation with the fluid material moving through said adapter; (c) a control module containing input and output circuits, disposed remotely from said sensing probe and interconnected therewith by suitable electrically conductive means, said control module adapted to receive a signal from said sensing probe through said input circuit and upon preset circuitry conditions, activate an outside electrical power supply through the said output circuit.

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3,978,461

## THREE WIRE DETECTION CIRCUIT

Thomas L. DeLime, III, Parsipanny-Troy Hills, N.J., assignor to Firetek Corporation, Clifton, N.J.

Filed May 12, 1975, Ser. No. 576,511
Int. Cl.[2] G08B 17/06
U.S. Cl. 340—227 R 9 Claims

1. A three wire electrical circuit for supplying electrical power to active, power-consuming fire detection devices and returning supervisory and alarm signals to a control panel comprising in combination:

a control panel;

at least one active, power-consuming fire detection device;

one active, power-consuming end-of-line device;

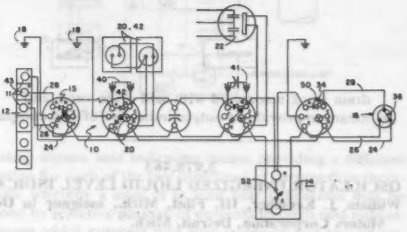
a plurality of sockets capable of receiving each of said active detection devices and said end-of-line device;

three electrically conductive wires, each connected to a terminal at said control panel, two of which are connected in series to corresponding terminals on each of said sockets and then to corresponding terminals on said socket for receiving said end-of-line device;

a third wire being connected to two corresponding terminals on each of said sockets in interrupt segments from each of said sockets to the next serial socket;

a bridging plurality of reverse-biased diodes connecting to corresponding terminals on each of said sockets to connect the interrupt segments of said third wire;

a source of electrical power at said control panel the minus terminal of which is connected to the first of three wires; the plus-terminal of which is connected to the second of said wires;



said end-of-line device containing a switching device which bridges the first of said wires having a negative voltage to said third wire if it senses power on the first and second of said wires;

each of said detectors containing a shunting strap which bridges the first of said wires having a negative voltage to said third wire;

each of said detectors containing a normally open switch which closes upon detection of combustion to bridge said second wire having a positive voltage to said third wire to indicate an alarm condition at said control panel;

said reverse-biased diodes permitting a positive voltage to pass through the interrupt segments of said third wire and preventing a negative voltage to pass therethrough;

voltage measuring means at said control panel.

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3,978,462

## DRAINAGE FLOW DETECTOR

Clark Goodman, 95 Antigua Court, Coronado, Calif. 92118

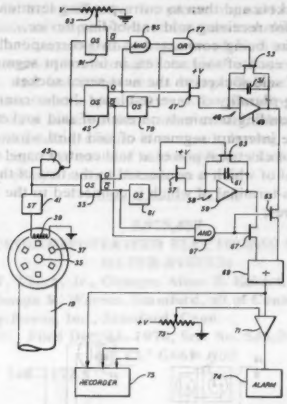
Filed Aug. 6, 1975, Ser. No. 602,431
Int. Cl.[2] G08B 21/00
U.S. Cl. 340—243 9 Claims

1. An improved drainage flow detector for predicting drainage blockages in a drain stack having an associated vent comprising:

a. means to measure the exhalation and inhalation of air from the vent stack in the drainage system and to provide outputs indicative thereof;

b. means having said outputs as inputs to compare the

length of time of an associated exhalation and inhalation in response to a quantity of liquid being dumped into a




drain stack associated with said drain vent; and

c. means to provide an output indicative of said comparison.

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**3,978,463**

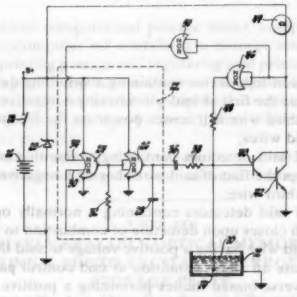
**OSCILLATOR ENERGIZED LIQUID LEVEL INDICATOR**

**William J. Kerscher, III, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Aug. 4, 1975, Ser. No. 601,598**

**Int. Cl.² G08B 21/00**

**U.S. Cl. 340—244 C** **1 Claim**



1. A liquid level warning circuit for use in monitoring the level of liquid in a container, the liquid being in electrically conducting relation to one terminal of a power supply, the circuit comprising

a warning device connected to the other terminal of the power supply,

an oscillator connected to the power supply, the oscillator having an alternating voltage output terminal and having an inhibit terminal effective to prevent oscillation when energized with unidirectional voltage;

switch means connected between the warning device and said one terminal of the power supply to selectively energize the warning device, said switch means having a control terminal capacitively coupled to the oscillator output terminal, and effective to energize the warning device in response to said alternating voltage;

a probe in the container to contact the liquid at a predetermined level and electrically connected to said control terminal so that when the probe is in contact with the liquid, the switch is turned off, and when the probe is out of contact with the liquid, the switch is biased on by an alternating voltage from the oscillator to energize the warning device,

first latch means responsive to the conduction state of the switch and connected to the control terminal to tend to bias the switch on once it has been turned on, and

second latch means responsive to the conduction state of the switch and connected to the inhibit terminal of the oscillator to prevent oscillation when the switch has been turned on,

whereby the two latch means in concert hold the switch on to continuously energize the warning device.

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**3,978,464**

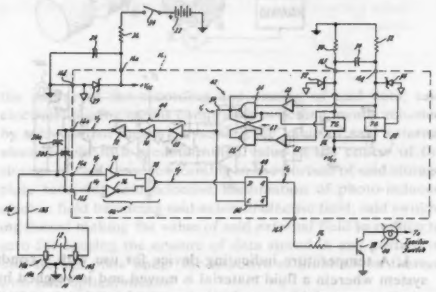
**MEANS FOR SENSING CHANGE IN THE AMOUNT OF FLUENT MATERIAL IN A RESERVOIR**

**Frederick Otto Richard Miesterfeld, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed Nov. 4, 1974, Ser. No. 520,581**

**Int. Cl.² G08B 21/00**

**U.S. Cl. 340—244 E** **19 Claims**



1. A sensor for sensing change in the amount of fluent material in a reservoir comprising:

an input circuit including a sensing element for providing an electrical resistance characteristic which changes in response to a change in the amount of fluent material in the reservoir, capacitor means, and means operatively coupling said capacitor means and said sensing element together to form an RC circuit having an RC time constant which changes in response to the change in the amount of fluent material in the reservoir;

an output circuit including warning means actuable for giving a warning indication; and

circuit means operatively coupling said input circuit and said output circuit, said circuit means comprising means for intermittently and repetitively energizing said input circuit to generate therein at selected sampling intervals whose durations are appreciably less than the durations between successive sampling intervals an electrical exponential transient representative of the RC time constant thereof, and means for monitoring each electrical exponential transient and for actuating said warning means in response to change in the transient indicative of the change in the RC time constant of said input circuit whereby indication is given when the change in the amount of fluent material in the reservoir occurs.

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**3,978,465**

**LINE ISOLATION MONITOR**

**John Park Goode, Fort Mitchell, Ky., assignor to ESB Incorporated, Philadelphia, Pa.**

**Filed Oct. 25, 1974, Ser. No. 518,098**

**Int. Cl.² G08B 21/00**

**U.S. Cl. 340—255** **9 Claims**

1. A line isolation monitor for sensing the presence or absence of faults to ground from a nominally isolated power line

carrying alternating current of a first frequency, the power line having a first conductor and a second conductor which comprises:

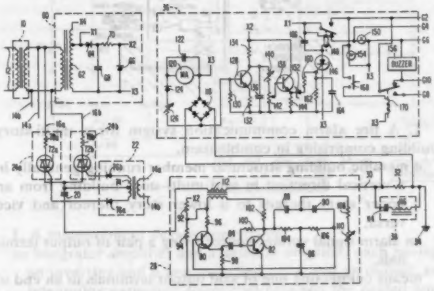
a. a capacitor having a first terminal and a second terminal;

b. a first gate having a power input and a power output, the power input being connected to the first conductor and the power output being connected to the first terminal of the capacitor, the first gate further having a control input;

c. a second gate having a power input and a power output, the power input being connected to the second conductor and the power output being connected to the first terminal of the capacitor, the second gate further having a control input;

d. a means for pulsing the gates operably connected to the control inputs of the first gate and second gate, the means for pulsing causing the first gate and the second gate to cyclicly close and open at a second frequency, the first gate being closed during the periods that the second gate is open and the second gate being closed during the periods that the first gate is open;

e. a source of alternating current having a third frequency, the third frequency being greater than the second frequency and greater than the first frequency, the source of alternating current having a first output terminal and a second output terminal, the first output terminal being connected to the second terminal of the capacitor;



f. a resistor having a first terminal and a second terminal, the first terminal being connected to the second output terminal of the source of alternating current and the second terminal being connected to the ground;

g. a means for bypassing alternating current, the means for bypassing having a first terminal and a second terminal, the first terminal being connected to the first terminal of the resistor and the second terminal of the means for bypassing being connected to the second terminal of the resistor, the means for bypassing being substantially conductive to alternating current of the first frequency and substantially non-conductive to alternating current of the third frequency; and,

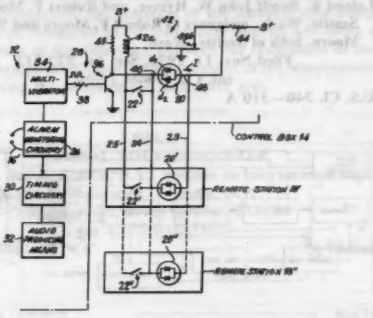
h. a means for sensing a potential difference, the means for sensing having a first terminal and a second terminal, the first terminal being connected to the first terminal of the resistor and the second terminal being connected to the second terminal of the resistor.

## 3,978,466
## ALARM SYSTEM INCLUDING REMOTE SIGNALLING MEANS

**Theodore Simon, 9 Maplewood Drive, Plainview, N.Y. 11803**

**Filed Sept. 22, 1975, Ser. No. 615,833**
**Int. Cl.² G08B *13/08***
**U.S. Cl. 340—274 R** **13 Claims**

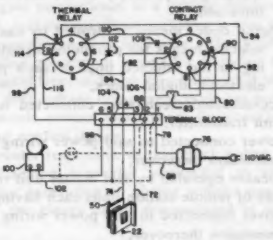
**1.** In an alarm system including an alarm circuit and alarm sensing means the state of which is changeable between a non-alarm condition and an alarm condition, the improvement comprising pulsing means connected to said alarm sensing means for generating a substantially constant voltage in said non-alarm condition and a pulsating voltage in said alarm condition of said alarm sensing means; switch means for enabling and disabling the alarm circuit and for providing higher and lower reference voltage as a function of the enabled and disabled conditions of the alarm circuit; and indicating means connected between said pulsing and switching means and adapted to permit current flow in each of two opposite directions therethrough as a function of the relative voltages provided by both said pulsating and switching means across said indicating means, said indicating means providing a different indication for each of the two directions of current flow therethrough, whereby a total of at least four indications may be obtained by selective passage of currents through said indicating means which currents may flow in one of said two opposing directions and which may be zero, constant or pulsed in each of said directions to thereby provide said indications in either constant or in pulsed form.



## 3,978,467
## DOOR ALARM SYSTEM RESPONSIVE TO FORCED ENTRY

**Albert F. Albert, 1029-108th N.E. No. 122, Bellevue, Wash. 98004**

**Filed Feb. 19, 1974, Ser. No. 443,765**
**Int. Cl.² G08B *13/08*; H01H *27/06***
**U.S. Cl. 340—274 R** **14 Claims**



**1.** An alarm system, comprising:

a. a pair of contact members mounted on a frame means adjacent a closure member to detect a forced opening of said closure member, said contact members being connected to an alarm circuit and comprising a first member generally in fixed position on said frame and a second member on said frame slightly spaced from said first member and electrically insulated therefrom, said second member being resiliently mounted for limited movement in response to movement by a portion of said frame such that upon being moved a predetermined distance it will make contact with said first member to energize said alarm circuit,

b. an alarm circuit connected to said contact members including an alarm means which is actuated upon energization of said circuit by said contact members, said alarm circuit remaining energized for a predetermined time even though said contact members lose contact with each other.

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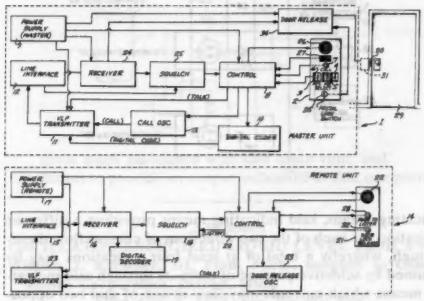
3,978,468

## INTERCOM CALL SIGNALING MECHANISM

Leland R. Bond; John W. Hymer, and Robert F. Moore, all of Seattle, Wash., assignors to Robert F. Moore and William B. Moore, both of Seattle, Wash.

Filed Nov. 11, 1974, Ser. No. 522,511
Int. Cl.² H04M 11/04
U.S. Cl. 340—310 A 6 Claims




1. In a signaling and communication system for a building including a master station and a plurality of remote stations, the combination of

electric power wiring extending throughout the building,

a master station unit at the master station and having

a transmitter connected to said power wiring for transmission thereover,

alerting signal mechanism connected to actuate said master unit transmitter and including

digital code selector means for selecting different predetermined electronic digital codes corresponding respectively to the several remote stations and

digital coder means controlled by said digital code selector means for producing signals corresponding to the selected ones of such predetermined electronic digital codes,

voice-actuated mechanism connected to said master unit transmitter,

a receiver connected to said power wiring for receiving transmission thereover,

a speaker operable by said master unit receiver,

a plurality of remote station units each having

a receiver connected to said power wiring for receiving transmission thereover,

speaker means operable by said remote unit receiver,

means for activating said remote unit speaker means to produce an audible alerting signal only in response to reception by its receiver of a signal corresponding to the predetermined electronic digital code signal generated by said master unit digital coder means corresponding to the particular remote station of said receiver,

means for activating said remote unit speaker means to produce voice sounds in response to reception by the remote unit receiver of signals generated by said master unit voice-actuated mechanism and transmitted by said master unit transmitter over said power wiring, and

a remote station unit transmitter connected to said power wiring for transmitting conversations thereover to said master station unit receiver.

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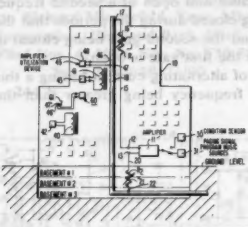
3,978,469

## METHOD AND APPARATUS FOR COMMUNICATING IN BUILDING STRUCTURES AND PARTS THEREOF PARTICULARLY MULTI-STORY BUILDING

Howard A. Schaad, 609 W. Monmouth St., Abingdon, Ill. 61410, and Richard L. Randolph, 26 Grande Paseo, San Rafael, Calif. 94903

Filed June 7, 1971, Ser. No. 150,429
Int. Cl.² H04M 11/04
U.S. Cl. 340—310 R 15 Claims



1. A fire alarm communication system for a multi-story building comprising in combination,

a metallic building structural member running generally in a vertical direction in said multi-story building from an upper story thereof to a lower story thereof and vice versa,

an alarm signal voltage source hving a pair of output terminals,

means connecting one of said output terminals to an end of said structural member at said upper story of said multi-story building,

means connecting the other of said output terminals to another end of said structural member at a lower story of said multi-story building,

one of said structural member and means connecting having an impedance matching means therein,

and means at each of the levels of said multi-story building to sense said signals and produce an alarm signal for the occupants of said building at each of said floors.

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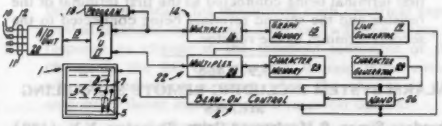
3,978,470

## MULTI-CHANNEL DATA COLOR DISPLAY APPARATUS

Lawrence T. McGuire, Wauwatosa, Wis., assignor to Midwest Analog and Digital, Inc., Wauwatosa, Wis.

Filed July 10, 1974, Ser. No. 487,010
Int. Cl.² G06F 3/14
U.S. Cl. 340—324 AD 28 Claims




1. A multiple channel data display apparatus for individual display of a plurality of monitored data as separate single line function graphs on a separate data channel, comprising a computer means having input means to receive the data and processing means for analyzing the monitored data and storing such data in a graphical memory means in accordance with a segment of the related single, line function, a color display means having a variable driver means, one driver means for

each of said channels, said display means being connected to said memory means and including a controller means for sequentially withdrawing of said information and applying said information to said individual color driver means to actuate the color drivers in accordance with the line segment data of the related channel, whereby said multiple channels are displayed with preset identifying color for each of said channels.

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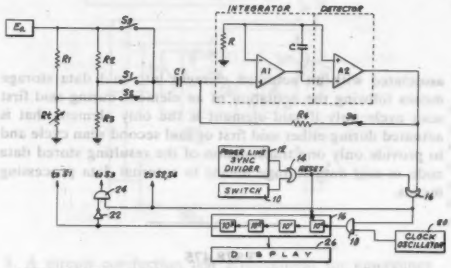
3,978,471

## DIGITAL THERMOMETER USING A DUAL SLOPE A/D CONVERTER WITHOUT A HIGH PRECISION VOLTAGE SOURCE

Austin T. Kelly, Morristown, N.J., assignor to Weston Instruments, Inc., Newark, N.J.

Filed Mar. 26, 1975, Ser. No. 562,194
Int. Cl.[2] H03K 13/20
U.S. Cl. 340—347 NT 14 Claims




1. A measurement device comprising:

an integrator amplifier and a detector amplifier each having an inverting and a non-inverting input and an output, an integrating capacitor connected between the output and the inverting input of the integrator amplifier, an integrating resistor connecting the inverting input of the integrator amplifier to ground, and means for connecting the inverting input of the detector amplifier to the output of the integrator amplifier and the noninverting input of the detector amplifier to the inverting input of the integrator amplifier, and an input capacitor having a right side connected to the noninverting input of the integrator amplifier;

a voltage source and a resistance bridge connected across the source, said bridge having a temperature responsive arm providing an output voltage by dividing the source voltage in accordance with the temperature of a portion of the arm and a temperature insensitive arm providing an output voltage by dividing the source voltage in accordance with a fixed ratio;

a first switch connecting the temperature insensitive bridge arm to the left side of the input capacitor to apply thereto the output voltage of the insensitive bridge arm when closed, a second switch connecting the temperature responsive arm to the left side of the input capacitor to apply thereto the output voltage of said temperature responsive arm when closed, a third switch connecting the source to the left side of the input capacitor to apply thereto the source voltage when closed, and a fourth switch connecting the right side of the input capacitor to the output of the detector amplifier to apply thereto the drift and offset of said amplifiers when closed;

means for maintaining the second and fourth switches closed and the first and third switches open for an initial time interval of sufficient duration to place on the input capacitor an initial charge reflecting the difference between the output voltage of the temperature sensitive bridge arm and the offset and drift of the amplifiers;

means for maintaining the first switch closed and the remaining switches open for a subsequent time interval of fixed duration which is short as compared to the initial time interval, to thereby apply to the integrator amplifier a measurement signal reflecting the difference between the output voltages of the two bridge arms; and

means for maintaining the third switch closed and all other switches open for a subsequent variable time interval which ends when the two inputs of the detector amplifier are at the same level, to thereby apply to the integrator amplifier during the variable time interval a reference signal reflecting the difference between the voltage of the source and the output voltage of the temperature insensitive bridge arm, the duration of the variable time being short as compared to the initial time interval and being a function of the difference between the resistances of the two bridge arms, thus being a measure of the temperature affecting the temperature responsive arm.

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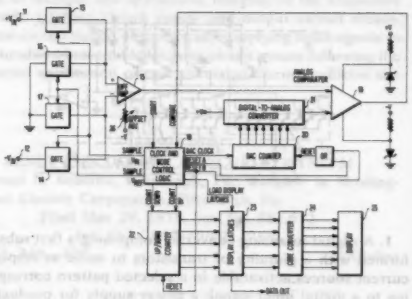
3,978,472

## DIGITAL VOLT-OHMMETER

Robert E. Jones, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,189
Int. Cl.[2] H03K 13/17
U.S. Cl. 340—347 CC 6 Claims




1. An analog-to-digital converter comprising:

high gain differential amplifier means for generating an output signal proportional to a voltage difference across its inputs, said output signal including a true and a drift voltage component, said high gain differential amplifier having offset adjustment means for adjusting the output voltage signal from said high gain differential amplifier so that said drift voltage component is always positive;

clock and mode control logic means for generating clock pulses and control signals;

a binary counter responsive to said clock pulses;

a digital-to-analog converter connected to said binary counter for generating an analog voltage signal proportional to the binary count accumulated in said binary counter;

comparator means responsive to said output and analog voltage signals for generating a compare signal when said voltage signals are equal, said binary counter being reset by said clock and mode control logic means each time a compare signal is generated by said comparator means;

reversible counter means responsive to said clock pulses and operating synchronously with said binary counter for counting in a first direction, said clock and mode control logic means being responsive to said compare signal for stopping the counting operation of said reversible counter means whereby the accmulated count in said reversible counter means is a digital indication of the value of said true and drift voltage components;

means responsive to said clock and mode control logic means for generating a null voltage across the inputs of said high gain amplifier means, said high gain amplifier

means then generating an output voltage signal in response to null voltage which comprises only said drift voltage components; and

said clock and mode control logic means again providing clock pulses to said binary counter and said reversible counter means, said reversible counter means counting in a second direction until said comparator means generates a compare signal when said drift voltage component and said analog voltage signal are equal, said reversible counter means thereby providing a digital output indication of the value of said true voltage component only.

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**3,978,473**

## INTEGRATED-CIRCUIT DIGITAL-TO-ANALOG CONVERTER

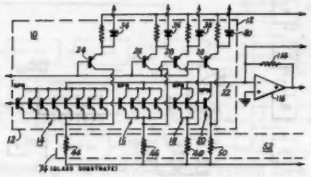
**James J. Pastoriza, Lincoln, Mass., assignor to Analog Devices, Inc., Norwood, Mass.**

**Continuation of Ser. No. 356,142, May 1, 1973, which is a division of Ser. No. 102,854, Dec. 30, 1970, Reissue Pat. No. 28,633.**

**This application July 14, 1975, Ser. No. 595,349**

**Int. Cl.² H03K *13/04***

**U.S. Cl. 340—347 DA** **6 Claims**



**1.** A digital-to-analog converter comprising a first substrate formed with a plurality of transistors to serve as respective current sources activatable in a selected pattern corresponding to a digital input signal; a power supply for producing a supply voltage for said transistors; circuit means on a second substrate for fixing the currents developed from each transistor in accordance with a weighting pattern based on the digital-to-analog relationship required; said first substrate further being formed with a reference transistor energized by said supply voltage; and sensing means responsive to the current flow through said reference transistor for adjusting said supply voltage produced by said power supply so as to tend to maintain the current through said reference transistor constant and thereby tend to maintain the currents through said current source transistors constant.

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**3,978,474**

## KEYBOARD WITH N-KEY LOCKOUT AND TWO-KEY ROLLOVER PROTECTION

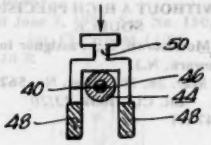
**Keith Allen Engstrom, Arlington Heights, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed July 15, 1975, Ser. No. 596,560**

**Int. Cl.² G08C *25/00***

**U.S. Cl. 340—365 E** **15 Claims**

**13.** A keyboard comprising a matrix of actuable elements each having an actuated state and an unactuated state, sensing means for sensing the state of each of the devices in the matrix, a storage device for temporarily storing the signals that are sensed by said sensing means, comparison means coupled to receive a first signal which is representative of the state of an actuated element during a second keyboard cycle and to said storage device which is representative of the state of said element during a first keyboard cycle which immediately preceded said second keyboard cycle, said comparison means being constructed to provide a key-detect signal only when said first and second signals do not compare, data storage means coupled to said sensing means for storing data codes that are coupled to said data storage means from said sensing means in accordance with the actuation of said actuable elements and logic circuit means coupled to said comparison means and to said data storage means which is responsive to said keydetect signal and is constructed to supply a gate signal to said data storage means for gating a selected data code




associated with an actuated element into said data storage means follwing the actuation of an element during said first scan cycle only if said element is the only element that is actuated during either said first or said second scan cycle and to provide only one transmission of the resulting stored data code in said data storage means to external data processing means.

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**3,978,475**

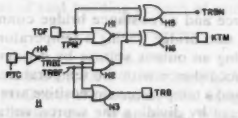
## TROUBLE INDICATOR CIRCUIT FOR A SECURITY SYSTEM

**Lawrence S. Schmitz, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 29, 1975, Ser. No. 582,551**

**Int. Cl.² G08B *29/00***

**U.S. Cl. 340—409** **4 Claims**




**1.** In a system having one or more condition sensing devices, and circuits for responding to signals produced by one or more of said condition sensing devices, the combination of, input circuit means connected to said sensing devices to generate a trouble output signal indicative of a circuit or component failure in said sensing device, a trouble indicator circuit means having a first input for receiving said trouble output signal and a second input for receiving a pulse waveform signal, said trouble indicator circuit means adapted to provide a first output signal to activate a visual circuit and a second output to activate an audio circuit, said trouble indicator circuit means responding to the absence of said trouble output signal by providing a constant level first output signal, and responding to the presence of said trouble output signal by terminating said first output signal and initiating said second output signal.

3,978,476

## CIRCUIT CONDUCTION TEST ARRANGEMENT FOR EMERGENCY ALARM SYSTEMS

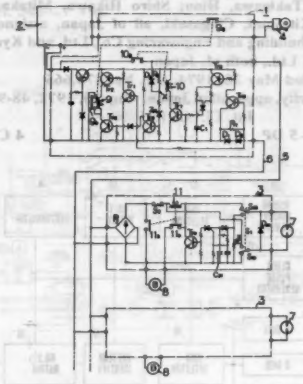
Takeshi Tanigawa, Machida, Japan, assignor to Hochiki Corporation, Tokyo, Japan

Filed Dec. 13, 1974, Ser. No. 532,484

Claims priority, application Japan, Dec. 17, 1973, 48-139611; Dec. 17, 1973, 48-139612; Dec. 17, 1973, 48-139613

Int. Cl.² G08B *29/00*

U.S. Cl. 340—410 10 Claims



1. A circuit conduction test arrangement for emergency alarm systems of the type having a receiving panel provided for a group of a plurality of sections to be supervised and including common alarm means, and a plurality of relay panels connected across a pair of conductors extending from said receiving panel, installed in the respective sections to be supervised; comprising in each of said relay panels a sensor and an alarm device connected in parallel across said conductors, said relay panels including a test switch, a reset switch and an impedance network for the circuit conduction test; said test switch being connected to vary the circuit connection of said relay panels such that, at the time of the test, said network is connected across said conductors to vary the input impedance of said relay panels from the value shown at the time when the respective said sensor is operated, and after that said network is disconnected to vary the input impedance to the same value as shown when said respective sensor is in operation; said receiving panel including means responsive to the variation of the input impedance, said responsive means having a first responsive device which operates while said respective sensor is in operation and which supplies power to said common alarm means, and a second responsive device which starts operating when said test switch is activated and said network is connected across said conductors; wherein said responsive devices are connected such that, when said second responsive device starts operating first, said first responsive device does not operate even if the input impedance achieves a value equal to that shown when said respective sensor is in operation after said network has been disconnected.

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3,978,477

## AUTOMATIC TEST SEQUENCE CIRCUIT FOR A SECURITY SYSTEM

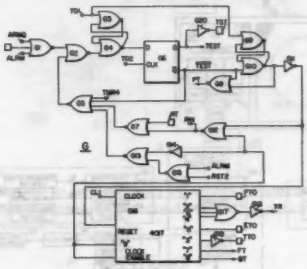
Lawrence S. Schmitz, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 29, 1975, Ser. No. 582,011

Int. Cl.² G08B *29/00*

U.S. Cl. 340—410 4 Claims

1. In a solid state security system having a plurality of alarm sensors for generating output signals in response to alarm conditions, a plurality of resettable latching circuit means responding to said output signals of said sensors by producing a digital output signal indicative of said alarm conditions, and output circuit means adapted to respond to said digital output signals by providing a manifestation of said alarm conditions, the combination of, a test circuit means having an input adapted to respond to a single input signal by sequentially supplying simulated alarm condition signals to said plurality of



resettable latching circuit means to activate said output circuit means to monitor the operational integrity of the respective resettable latching circuit means and output circuit means, said test circuit means automatically supplying reset signals to said plurality of resettable latching circuit means following the sequential application of said simulated alarm condition signals.

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3,978,478

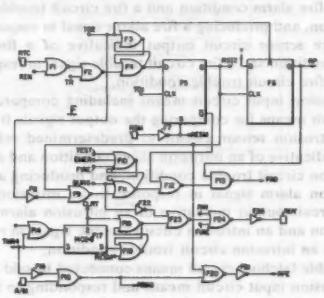
## RESET CIRCUIT FOR A SECURITY SYSTEM

Lawrence S. Schmitz, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 29, 1975, Ser. No. 582,012

Int. Cl.² G08B *19/00*, *29/00*

U.S. Cl. 340—420 3 Claims



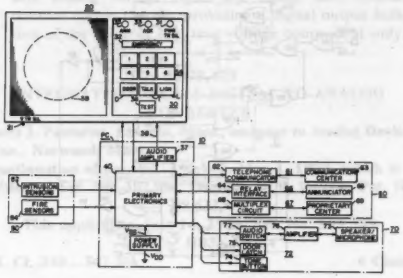
1. In a solid state security system having fire and intrusion sensors to produce sensor output signals in response to fire alarm conditions and intrusion alarm conditions respectively, arm/disarm circuit means associated with said intrusion sensors to respond to input signals to arm and disarm the intrusion sensors of said solid state security system, and resettable latching circuit means operatively connected to said sensors to respond to said sensor output signals indicative of alarm conditions by developing a digital output signal indicative thereof and maintaining said digital output signal in a latched condition, the combination of a circuit means operatively connected to said latching circuit means to monitor the output signals of said sensors, and circuit means responding to an externally initiated signal by transmitting reset signals to said latching circuit means and transmitting an arm/disarm input signal to said arm/disarm circuit means.

## 3,978,479

## SOLID STATE SECURITY SYSTEM

Lawrence S. Schmitz, Costa Mesa, Calif., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 29, 1975, Ser. No. 582,553
Int. Cl.[2] G08B 19/00, 29/00
U.S. Cl. 340—420 11 Claims



1. A solid state security system for monitoring alarm conditions, such as fire and intrusion, comprising, at least one fire sensor circuit for generating output signals in response to a fire alarm condition and in response to a fire circuit trouble condition corresponding to a circuit or component malfunction,

at least one intrusion sensor circuit for generating output signals in response to an intrusion alarm condition and in response to an intrusion circuit trouble condition corresponding to a component or circuit malfunction,

primary electronics comprising:

digital pulse wave excitation means,

fire input circuit means including comparator circuit means for comparing the output signals from said fire sensor circuit to predetermined references indicative of a fire alarm condition and a fire circuit trouble condition, and producing a fire alarm signal in response to a fire sensor circuit output indicative of a fire alarm condition and a fire circuit trouble signal in response to a fire circuit trouble condition,

intrusion input circuit means including comparator circuit means for comparing the output signals from said intrusion sensor circuit to predetermined references indicative of an intrusion alarm condition and an intrusion circuit trouble condition, and producing an intrusion alarm signal in response to an intrusion sensor circuit output indicative of an intrusion alarm condition and an intrusion circuit trouble signal in response to an intrusion circuit trouble condition,

resettable latching circuit means connected to said fire and intrusion input circuit means and responding to said fire alarm signal and intrusion alarm signal by maintaining a digital output signal indicative of said fire and intrusion alarm signals,

digital noise generator circuit means operatively connected to said latching circuit means and driven by said digital pulse wave excitation means for initiating distinctively different digitally modulated, frequency modulated digital audio waveforms in response to said fire and intrusion alarm signals, respectively,

trouble indicator circuit means operatively connected between said fire and intrusion input circuit means and said digital noise generator circuit means to initiate a digitally modulated, frequency modulated digital audio waveform from said digital noise generator circuit means distinctly indicative of a fire circuit trouble condition in response to a fire circuit trouble signal, and to initiate a digitally modulated, frequency modulated digital audio waveform from said noise generator circuit means distinctively indicative of an intrusion circuit trouble condition in response to an intrusion circuit trouble signal, and

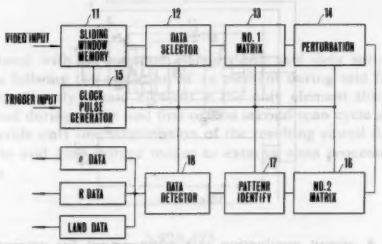
audio means operatively connected to said digital noise generator circuit means to manifest said digitally modulated frequency modulated digital audio waveforms.

## 3,978,480

## METHOD OF IDENTIFYING THE PATTERNS OF RADAR SIGNALS

Sueichi Tsuruta, Fujisawa; Hiroharu Nishiguchi, Tokyo; Takamura Takigawa, Hino; Shiro Hikawa, Mitaka, and Kazunori Kitasumi, Chigasaki, all of Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd. and Kyoritsu Dempa Co., Ltd., both of, Japan

Filed May 28, 1974, Ser. No. 473,665
Claims priority, application Japan, Aug. 15, 1972, 48-90992
Int. Cl.[2] G01S 9/00
U.S. Cl. 343—5 DP 4 Claims




1. A method of processing a pattern of returned target signals for a polar scanning type radar system comprising establishing a unit scanning surface which is bounded by two scanning beam radii spaced from each other a predetermined angle and two circular arcs spaced from each other a predetermined distance in the radial direction in a scanning plane of the polar scanning type radar system, said polar scanning type radar system employing a plurality of actual scanning beams which are sampled for target information, the size of said unit scanning surface being determined by the nature and size of targets to be identified by the radar system such that a target corresponding to a received pattern of target signals from said unit scanning surface can be judged from the size of said pattern, said unit scanning surface being shifted progressively in the radial and circumferential directions to search an area for received patterns of target signals and providing a means for judging the target, said method of processing the received pattern of target signals further comprising the steps of dividing the surface of a target area being searched by the radar system into a plurality of annular search sections defined by a plurality of concentric circles having increasing radii measured from a center that identifies the location of the radar system, sequentially scanning a plurality of unit scanning surfaces each having substantially the same annular search section area over the entire surface of a target area being searched by the radar system, recording the received pattern of target signals in a memory in such a manner that the ratio of the number of sampled scanning beams to the number of actual scanning beams is a maximum when scanning an annular search section which is located most remotely from the center, gradually decreasing the percentage of extraction of sampled scanning beams of annular search sections closest to the center, so that the percentage of extraction becomes a minimum of 1/n (where n is an integer) while scanning an annular search section closest to the center, each unit scanning surface being sequentially scanned with an actual scanning beam at equal increments in both the radial and circumferential directions and at substantially equal spacing so as to obtain a pattern of the received target signals in accordance with the presence or absence of a target, and judging said

target in accordance with the size of said pattern of received target signals.

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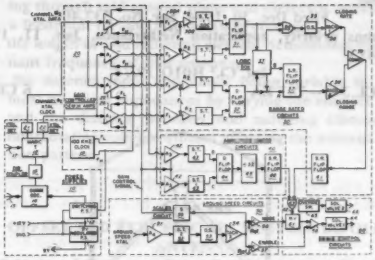
3,978,481

## ANTI-COLLISION VEHICULAR RADAR SYSTEM

James H. Angwin, Merrimack, N.H., and John B. Flannery, Chelmsford, Mass., assignors to Merlin A. Pierson, Newton, Mass.

Filed June 17, 1974, Ser. No. 479,854
Int. Cl.² G01S 9/24
U.S. Cl. 343—7 VM 16 Claims



1. A vehicular radar system for automatically decelerating or stopping a vehicle to avoid a collision with an obstacle, said system comprising:

transmitter means mounted on the vehicle for transmitting an electromagnetic signal in the path of motion of the vehicle,

means for receiving the transmitted signal after reflection from an obstacle that may appear in the path of the vehicle,

means responsive to said transmitted and received signals for providing a pair of doppler frequency signals the relative phase relationship therebetween being asymmetric and indicative of either a closing or opening situation between vehicle and obstacle,

means for detecting vehicle speed relative to the ground and providing a signal corresponding to vehicle speed,

at least a pair of gain-controlled means for receiving respectively the doppler frequency signals and amplifying said doppler frequency signals,

means for coupling said vehicle speed signal to both said gain-controlled means for controlling the gain of both said means in accordance with said vehicle speed, and

means responsive to the amplified doppler frequency signals from said at least one pair of gain-controlled means when said signals exceed a predetermined frequency for controlling the applying of the vehicle brakes.

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3,978,482

## DYNAMICALLY FOCUSED THINNED ARRAY

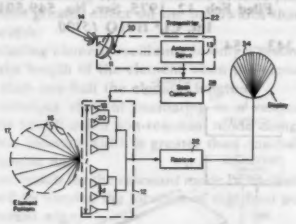
Frederick C. Williams, Topanga, and Elvin E. Herman, Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 24, 1975, Ser. No. 561,523
Int. Cl.² G01S 9/06
U.S. Cl. 343—11 R 15 Claims

1. A focusing system for a receiving antenna having a plurality of antenna receiving elements each having mixing means comprising:

oscillator means providing a frequency change as a first selected function of time,

and feed means coupled between said oscillator means and each of said mixing means for providing a path length



distribution to said plurality of antenna elements varying between elements as a second selected function.

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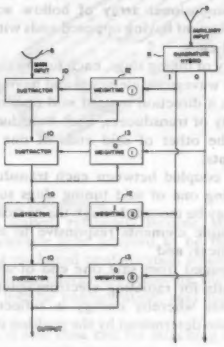
3,978,483

## STABLE BASE BAND ADAPTIVE LOOP

Bernard L. Lewis, Oxon Hill, and James P. Hansen, Waldorf, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 26, 1974, Ser. No. 536,698
Int. Cl.² G01S 3/06
U.S. Cl. 343—100 LE 6 Claims



1. An improved signal cancelling system comprising:

first input means for providing a main channel signal;

second input means for providing an auxiliary channel signal;

quadrature hybrid circuit means coupled to said second input means for providing in-phase and quadrature components from said auxiliary channel signal;

first adaptive loop means coupled to receive said main channel signal and one of said components for causing said main channel signal to become orthogonal to the one of said components and form a main channel residue signal output; and

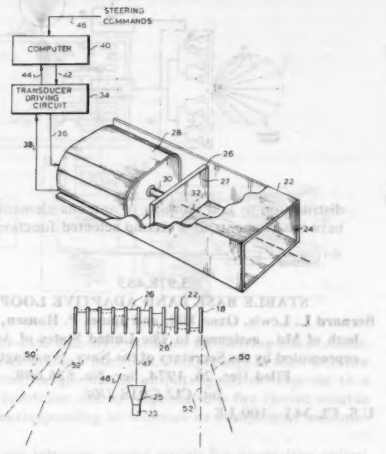
second adaptive loop means coupled to receive said main channel residue signal output and the other of said components for cancelling said main channel residue signal output and provide a cancelled main channel signal output.

**3,978,484**

## WAVEGUIDE-TUNED PHASED ARRAY ANTENNA

**Donald C. Collier, 3825 SW. Sixth Place, Gainesville, Fla. 32607**

**Filed Feb. 12, 1975, Ser. No. 549,501**
**Int. Cl.² H01Q 15/00**
**U.S. Cl. 343—754** **8 Claims**




1. A phased array radar antenna comprising:

a two dimensional array of hollow waveguide elements, each element having opposed ends with an opening at one of said ends;

a plurality of tuning slugs, each tuning slug positioned in one of said waveguide elements and having a substantially flat face in a direction toward said opening at said one end;

a plurality of transducers, each transducer positioned adjacent the other of said ends of one of said waveguide elements;

a piston coupled between each transducer and the corresponding one of said tuning slugs such that said tuning slug may be moved through the corresponding one of said waveguide elements responsive to energization of said transducer; and

means spaced from said one end of all of said waveguide elements for radiating electromagnetic energy into said elements whereby energy is reflected therefrom in a direction determined by the position of said tuning slugs.

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**3,978,485**

## DIRECTIONAL SLOT ANTENNA FOR VERY HIGH FREQUENCIES

**Pierre Bonnaval, Paris, France, assignor to Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France**

**Filed May 25, 1965, Ser. No. 458,787**
**Int. Cl.² H01Q 13/10**
**U.S. Cl. 343—767** **3 Claims**

3. A continuous slot antenna having an improved radiation patern comprising:

a. a section of rectangular wave guide,

b. a long continuous slot cut in one broad face of said wave guide,

c. said slot being positioned with respect to the wave guide centerline such that the slot coupling is controlled by varying the distance said slot is offset from said centerline along the length thereof to conform to a predetermined aperture distribution, the power radiated at any point along the slot being determined by the amount of slot offset from the centerline at that point.

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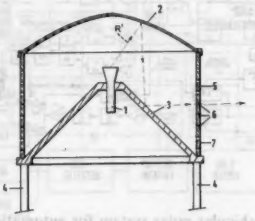
**3,978,486**

## ANTENNA REFLECTOR SUPPORT

**Michiel Antonius Reinders, 51 Westergo, Zoetermeer, Netherlands**

**Filed Dec. 30, 1974, Ser. No. 537,403**
**Claims priority, application Netherlands, Jan. 11, 1974, 7400413**
**Int. Cl.² H01Q 19/14**
**U.S. Cl. 343—781 EA** **6 Claims**



1. In an omnidirectional micro-wave antenna comprising:

A. a parabolic reflector,

B. a feed means at the focus of said parabolic reflector,

C. a conical reflector coaxial with and spaced from said parabolic reflector for reflecting the parallel rays from said parabolic reflector radially omnidirectionally, said feed means mounted in the vicinity of the apex of said conical reflector,

the improvement comprising:

D. a passive cylindrical support for said parabolic reflector surrounding said control reflector and coaxial therewith, said support comprising an electrically conductive material containing slots for the transfer of energy radially from the inside to the outside of said support.

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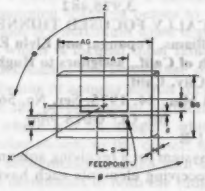
**3,978,487**

## COUPLED FED ELECTRIC MICROSTRIP DIPOLE ANTENNA

**Cyril M. Kaloi, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 24, 1975, Ser. No. 571,155**
**Int. Cl.² H01Q 1/38**
**U.S. Cl. 343—829** **9 Claims**




1. A coupled fed electric microstrip dipole antenna having

low physical profile and conformal arraying capability, comprising:

a. a thin ground plane conductor;

b. a thin rectangular microstrip radiating element and a separate smaller thin rectangular shaped microstrip nonradiating coupler alongside and spaced apart from said radiating element;

c. said radiating element and nonradiating coupler being parallel to each other in the same plane and equally spaced from said ground plane;

d. said radiating element and nonradiating coupler being electrically separated from said ground plane by a dielectric substrate;

e. said nonradiating coupler being fed from a coaxial-to-microstrip adapter, the center pin of said adapter extending through said ground plane and dielectric substrate to a feedpoint on said nonradiating coupler;

f. the length of said radiating element determining the resonant frequency of said antenna;

g. the antenna input impedance being variable to match most practical impedances by varying the coupler length and the distance between said radiating element and nonradiating coupler without affecting the antenna radiation pattern.

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**3,978,488**

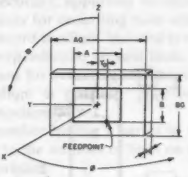
## OFFSET FED ELECTRIC MICROSTRIP DIPOLE ANTENNA

**Cyril M. Kaloi, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 24, 1975, Ser. No. 571,157**

**Int. Cl.² H01Q *1/38***

**U.S. Cl. 343—829** **10 Claims**




1. An offset fed electric microstrip dipole antenna having low physical profile and conformal arraying capability, comprising:

a. a thin ground plane conductor;

b. a thin substantially rectangular radiating element spaced from said ground plane;

c. said radiating element being electrically separated from said ground plane by a dielectric substrate;

d. the dimension of said radiating element along the length thereof lies in the E-plane and the dimension of said radiating element along the width thereof lies in the H-plane; the dimension of said radiating element which lies in the H-plane never being greater than the dimension thereof which lies in the E-plane;

e. said radiating element having a feed point located along the edge of the length thereof;

f. said radiating element being fed from a coaxial-to-microstrip adapter, the center pin of said adapter extending through said ground plane and dielectric substrate to said radiating element;

g. the length of said radiating element determining the resonant frequency of said antenna;

the antenna input impedance being variable to match most practical impedances as said feed point is moved along said edge of the length of said antenna radiating element without affecting the antenna radiation pattern;

i. the antenna bandwidth being variable with the width of the radiating element and the spacing between said radiating element and said ground plane, said spacing between the radiating element and the ground plane having somewhat greater effect on the bandwidth than the element width;

j. said radiating element oscillating in only a resonant mode along the length of the element when the element width is less than one-half the element length;

k. said radiating element oscillating in a resonant mode along its length and a non-resonant mode along its width when the element width is greater than one-half the element length; and

l. optimum match for the resonant mode of oscillation being obtained by varying the location of said feed point along the element edge.

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**3,978,489**

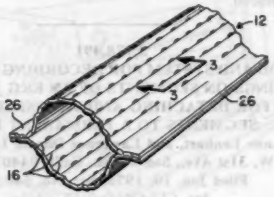
## TUBULAR STRAIN ENERGY DEPLOYABLE LINEAR ELEMENT ANTENNA WITH STITCHED WIRE CONDUCTORS

**Richard M. Kurland, Sherman Oaks, and Gelb N. Fruktow, Los Angeles, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Continuation-in-part of Ser. No. 425,047, Dec. 14, 1973, abandoned. This application June 2, 1975, Ser. No. 583,334**

**Int. Cl.² H01Q *1/08***

**U.S. Cl. 343—874** **3 Claims**




1. A linear antenna comprising:

a relatively thin walled, resiliently flexible, strain energy deployable dielectric tube adapted to be flattened and contracted to a packaged configuration wherein the tube stores elastic strain energy for restoring the tube to its normal linear tubular configuration, said tube having a base end;

mounting means at said base end for attaching said tube to a support;

slender flexible conductor wires spaced circumferentially about and extending along the tube wall generally parallel to the tube axis and having base ends at the base end of said tube;

stitching extending through the tube wall and around each conductor wire for securing said wires to the tube wall in a manner which accommodates relative endwise slippage between the wires and tube during contraction and deployment of the tube; and

the base ends of said conductors being electrically joined.

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**3,978,490**

## FURLABLE ANTENNA

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Morris A. Barnett, South Pasadena, Calif.**

**Filed Sept. 24, 1975, Ser. No. 616,333**

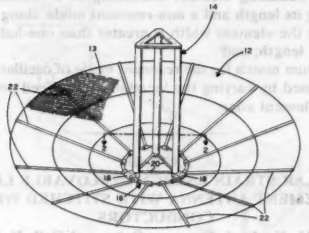
**Int. Cl.² H01Q *15/20***

**U.S. Cl. 343—882** **6 Claims**

1. A furlable antenna comprising:

A. a deployment actuator including an annular member characterized by a selected elastic modulus;

B. an annular array of uniformly spaced antenna ribs rigidly affixed at one end thereof to said annular member and supported by said member for pivotal displacement from a deployed configuration, wherein the ribs are extended substantially radially from said annular member, to a furled configuration wherein said ribs are extended in substantial parallelism;



C. a flexible reflecting web extended between said ribs and affixed thereto; and

D. a plurality of bearing blocks rotatably supporting said annular member in a manner such that every radially extended section of the member is supported for rotation in its own plane, about its own centroid, as said array is displaced.

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**3,978,491**

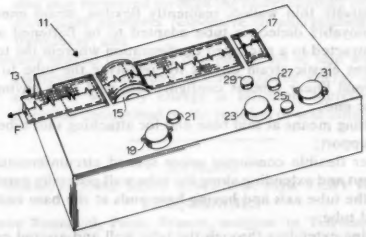
## METHOD AND SYSTEM FOR RECORDING HEART LEAD TRACINGS ON SEGMENTS OF AN EKG DATA STRIP AND FOR DETACHING AND TRANSFERRING THE SEGMENTS TO A PERMANENT FILE

**Gerry Anne Lenhart, and Lawrence Donald Lenhart, both of 1235 W. 31st Ave., San Mateo, Calif. 94403**

**Filed Jan. 10, 1975, Ser. No. 540,005**

**Int. Cl.² G01D 9/12, 15/34**

**U.S. Cl. 346—1** **17 Claims**



**1.** A method of preparing an electrocardiogram (EKG) data strip for individual heart lead tracings to be transferred into a permanent record file, said method comprising,

forming a first longitudinal line of perforations adjacent one side edge of an EKG data strip,

forming a second longitudinal line of perforations adjacent to the other side edge of the EKG data strip, and

forming a plurality of transverse lines of perforations across the EKG data strip between said first and second longitudinal lines of perforations and at spaced intervals along the length of the EKG strip to thereby divide the central part of the strip into a plurality of longitudinally aligned segments, each of which has a predetermined width between the longitudinal perforations and a predetermined length between two adjacent transverse perforations and each of which is readily detachable from the EKG data strip along the longitudinal and transverse perforations and including recording a heart tracing on the EKG data strip between the first and second longitudinal lines and detaching the part of the data strip bearing the recorded tracing from the rest of the strip by tearing along the longitudinal and transverse line bounding the recording, said step of recording the heart tracing including recording the tracing with a stylus mounted for movement in a direction across the width of a segment on the upper surface of the data strip with changes in amplitude of the heart trace signal, moving the data strip longitudinally beneath the stylus by a friction drive roller which frictionally engages the underside of the data strip and wherein the EKG data strip upper surface is formed with a line grid and the transverse perforations have individual serrations sufficiently smaller than the width of the stylus engaged with the data strip that the stylus bridges the perforations to prevent the perforations from interfering with the movement of the stylus with respect to the data strip during recording.

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**3,978,492**

## PROCESS FOR THE ELECTROGRAPHIC RECORDING OF CHARGE IMAGES IN A LOW ELECTRON AFFINITY CASE

**Walter Simm, Leverkusen, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany**

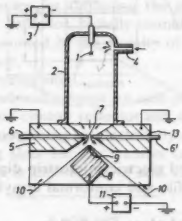
**Continuation of Ser. No. 291,045, Sept. 21, 1972, abandoned.**

**This application Feb. 13, 1975, Ser. No. 549,669**

**Claims priority, application Germany, Sept. 25, 1971, 2148001**

**Int. Cl.² G03G 15/044, 13/044**

**U.S. Cl. 346—74 J** **14 Claims**

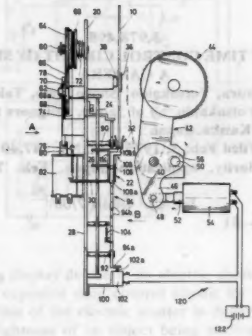


**1.** The electrographic recording process of producing charge images on a recording material capable of being electrically charged by establishing a gas discharge current stream applying a voltage between a corona discharge electrode and a counter electrode, and controlling the density of the charge of the recording material by selectively applying a control potential to control electrodes interposed between said corona discharge electrode and said counter electrode, whereby part of the discharge current stream is changed in its intensity by means of said control electrodes, moving the recording material past the control electrodes and over the counter electrode, wherein the improvement comprises carrying on the gas discharge and control of the discharge partial current while positioning the corona discharge electrode, counter electrode and control electrode in a gas stream consisting of a gas having an electron affinity of less than 1 eV whereby this gas is ionized to selectively charge the record.

## 3,978,493
## TIME RECORDER

Günther Trischler, Plochingen, Neckar, and Hartmut Reichert, Esslingen-1-Zell, both of Germany, assignors to Simplex Time Recorder Company, Gardner, Mass.

Filed Sept. 9, 1974, Ser. No. 504,097
Claims priority, application Germany, Sept. 11, 1973, 2345728; May 17, 1974, 2424146
Int. Cl.² G01D 15/20
U.S. Cl. 346—82 6 Claims



1. In a time recorder, apparatus including:
a. Printing means for recording time information entries on lines of a record medium inserted into said recorder in a direction perpendicular to said lines;
b. control means for actuating said printing means when the record medium is properly positioned within the recorder, comprising:
1. a first member having a series of spaced stops corresponding to the number of lines on said record medium to be imprinted,
2. a second member capable of engaging and disengaging said stops on said first member, one of said members, when both are disengaged, being capable of movement with the record medium as it is inserted, the other member remaining stationary relative thereto, and both members, when engaged as a result of the record medium having been inserted to a proper position, being capable of slight conjoint movement; and
3. a switch actuatable by said slight conjoint movement of said first and second members to trigger said printing means.

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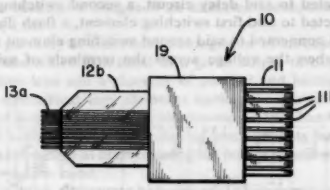
## 3,978,494
## STYLUS ASSEMBLY

Alvin John Noker, Bountiful, Utah, assignor to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 13, 1975, Ser. No. 631,633
Int. Cl.² G01D 15/10
U.S. Cl. 346—139 C 9 Claims

1. A stylus for writing on electrosensitive paper, comprising in combination;
support means
a plurality of electrically conductive wires wrapped about said support means to form at least one writing tip extending from one end of the support means and an electrical connector at the other end of said support means, said support means comprising a relatively thin form with opposing flat surfaces having a plurality of grooves formed around one end and extending substantially halfway down each flat surface thereof for receiving individual ones of said plurality of wires.



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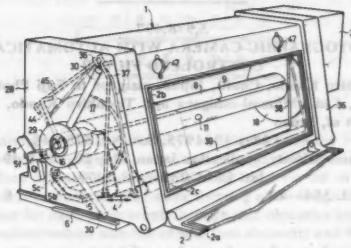
## 3,978,495
## FILM CASSETTE FOR A PHOTOCOMPOSING MACHINE

Helmut Warscheit, Ober-Roden, Germany, assignor to Mergenthaler Linotype GmbH, Frankfurt, Germany

Filed Feb. 12, 1975, Ser. No. 549,385
Claims priority, application Germany, Feb. 11, 1974, 46121[U]
Int. Cl.² B41B 13/00; B65H 75/28
U.S. Cl. 354—5 3 Claims



1. A film cassette for a photocomposing machine comprising, a cassette housing having opposed side walls, a rotatable shaft extending between said housing sidewalls and through one of said sidewalls, a take up reel supported on said shaft for rotation therewith, an electric drive motor, clutch means for connecting said motor to said take up reel, a clamping device mounted on said shaft for clamping a film strip to said take up reel, and lever means for sliding said shaft axially with respect to said take up reel for simultaneously opening said clamping device and disengaging said clutch means.

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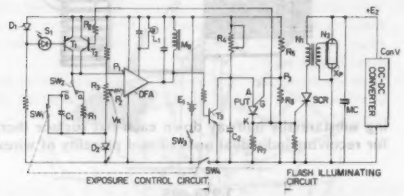
## 3,978,496
## AUTOMATIC FLASH-PHOTOGRAPHING ARRANGEMENT

Kunio Matsumoto, Ageo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed June 11, 1975, Ser. No. 585,870
Claims priority, application Japan, June 13, 1974, 49-67307
Int. Cl.² G03B 7/16
U.S. Cl. 354—33 5 Claims

1. An automatic flash-photographing arrangement comprising a photoelectric current amplifying circuit, a first capacitor connectable to said photoelectric current amplifying circuit, a differential amplifier connected to said photoelectric current amplifying circuit, an electro-magnet connected to said differential amplifier and de-energized when said first capacitor is connected to said photoelectric current amplifying circuit and the voltage across the terminals of said capacitor reaches a pre-determined value, a switch member connected

to said electro-magnet and closed when said electro-magnet is de-energized, a delay circuit connected to said switch member and comprising a second capacitor, a first switching element connected to said delay circuit, a second switching element connected to said first switching element, a flash illuminating circuit connected to said second switching element and operated when the voltage across the terminals of said second




capacitor reaches a pre-determined value, and means including a transistor connected to said first switching element for feeding back an ON-condition of said first switching element to said first capacitor, said automatic flash-photographing arrangement causing flash-photography to be automatically carried out when the exposure time decided by said first capacitor becomes longer than the time predetermined by said delay circuit.

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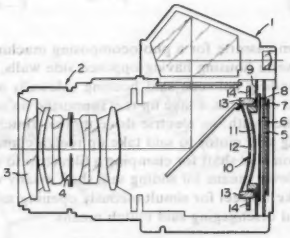
**3,978,497**

## PHOTOGRAPHIC CAMERA WITH AUTOMATICALLY CONTROLLED FILTER

**Toshihiro Kondo, Chofu, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara and Toshihiro Kondo, Tokyo, both of, Japan**

**Filed May 19, 1975, Ser. No. 578,948**
**Claims priority, application Japan, May 20, 1974, 49-55392**
**Int. Cl.² G03B 7/08, 9/00**
**U.S. Cl. 354—43** **8 Claims**



1. A photographic camera wherein the aperture size of a diaphragm and the shutter speed are freely selectable and the density of a filter is automatically controlled in accordance with the scene brightness comprising in combination:

a diaphragm the aperture size of which is freely selectable by manual operation,

a shutter the exposure time of which is freely selectable by manual operation,

a light measuring circuit which measures the scene brightness and gives an output corresponding to the measured scene brightness taking the selected aperture size and the selected shutter speed into account,

a density-variable filter located on the optical axis of a taking lens of the camera the density or light transmittivity of which is variable,

a filter operating means for varying said density of the density-variable filter,

an electromagnetic starting means for starting operation of said filter operating means,

an electromagnetic stopping means for stopping operation of said filter operating means, and

an electromagnet controlling circuit which controls the time interval between the operation of said electromagnetic starting means and the operation of said electromagnetic stopping means,

said light measuring circuit being connected with said electromagnet controlling circuit for controlling said time interval in accordance with said output of the light measuring circuit.

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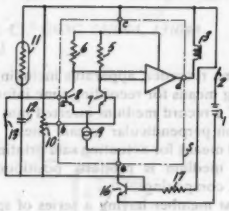
**3,978,498**

## EXPOSURE TIME CONTROL CIRCUIT OF SHUTTER OF A CAMERA

**Yukio Nakamura, Yotsukaido; Shogo Kato, Talei, and Shinji Nagaoka, Yotsukaido, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan**

**Filed Feb. 5, 1975, Ser. No. 547,401**
**Claims priority, application Japan, Feb. 7, 1974, 49-15638[U]**
**Int. Cl.² G03B 7/08**
**U.S. Cl. 354—51** **3 Claims**



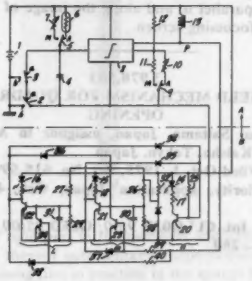
2. In an exposure time control circuit of a camera of the type having an integrated circuit including, as an input stage, a transistorized differential amplifier having first and second input terminals which comprise terminals of said integrated circuit, a pair of power terminals connectable during use of the exposure time control circuit to an electric power source, and an output terminal; a time-constant circuit connectable to the electric power source and operable to develop a timing signal representative of the brightness of the object field being photographed and apply the same as an input signal to said first input terminal; and a variable resistor connected in parallel with said time-constant circuit and being selectively variable so as to apply a voltage level within a range of voltage levels as an input signal to said second input terminal: means to compensate for the base-emitter voltages of the transistors constituting said transistorized differential amplifier to thereby enlarge the range of voltage levels which can be applied to said second input terminal to enable other input signals representative of exposure variables other than the brightness of the object field to be applied to said second input terminal, said means comprising a transistor having its base connected to the junction point of said variable resistor and said time-constant circuit and having its collector-emitter path connected to one of said pair of power terminals.

3,978,499

## WARNING DISPLAY CIRCUIT OF THE ELECTRIC SHUTTER FOR CAMERA

Shinji Nagaoka; Shogo Kato, and Yukio Nakamura, all of Chiba, Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Jan. 15, 1975, Ser. No. 541,338
Claims priority, application Japan, Jan. 16, 1974, 49-7953
Int. Cl.[2] G03B 7/00
U.S. Cl. 354—60 L 1 Claim



1. A warning display device in an electric shutter of a camera having an exposure time control circuit for determining the exposure time of the electric shutter in dependence upon at least the brightness of an object being photographed and developing an exposure time signal in dependence upon said brightness; said warning display device including a warning display circuit comprising a first stage circuit (N) having an over exposure indicating element (14) and a single transistor (20) for driving said over exposure indicating element; a second stage circuit (M) and a third stage circuit (L); each of said second stage circuit and said third stage circuit having a corresponding display inidicating element (15, 16), a driving transistor (21, 22) for driving the corresponding display indicating element, an RC integrating circuit (26, 30, 27, 31) directly connected to the base of the last-mentioned driving transistor (21, 22) and a clamping transistor for clamping the corresponding driving transistor upon said warning display circuit receiving an exposure time signal from said exposure time control circuit, diode means (34, 35, 36, 37, 38) connected for feedback among the first, second and third stages of the warning display circuit and between the warning display circuit and the exposure time control circuit for preventing signals energizing one stage display indicating element from energizing the display indicating elements of the other stages; means including a switch for controlling operation of said exposure time control circuit; connections from said exposure time control circuit for applying said exposure time signal to said warning display circuit; and each RC circuit developing a corresponding independent reference signal for comparison with said exposure time signal for control of operation of a corresponding display indicating element.

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3,978,500

## PROCESS FOR RECORDING AND REPRODUCING IMAGES

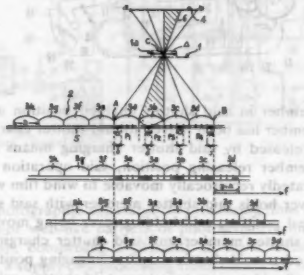
Roland Francis Charles Brachet, Domaine d'Arnaga, 83810 Callian, France

Filed Nov. 21, 1973, Ser. No. 417,920
Int. Cl.[2] G03B 1/00
U.S. Cl. 354—123 6 Claims

1. A method of recording images on a supporting surface which permits an observer, in the case of relative movement between said observer and said supporting surface along a line substantially parallel to said supporting surface, to perceive images located at each moment on said supporting surface at a predetermined angle of observation relative to said observer such as to present an appearance to said observer that substantially no relative movement along said line is occurring between said images and said observer, said images being identical or successive images of an animated scene, comprising the steps of:

taking a plurality of successive photographs of an object on a photosensitive film band of a given length through an objective lens and a plurality of parallel and juxtaposed plano-cylindrical lens elements having the planar faces thereof in contact with said photosensitive film band, said planar surfaces of said plurality of lens elements forming an overall length at least equal to the length of said photosensitive film band;

causing relative movement between said photosensitive film band and said lens elements together on the one hand and said objective lens on the other hand along a line parallel to the surface of said film band and perpendicular to the axes of said lens elements between the taking of successive photographs;



maintaining the axis of the rays of light forming the image for each photograph at a constant angle relative to the surface of said photosensitive film band for all of said successive photographs, while forming a full image of the object for each photograph through said objective lens on a predetermined number of said lens elements and forming a linear partial image of the object for each photograph through each of said predetermined number of said lens elements onto said film band being of a linear extent on said film band equal only to a fractional part of the width of one of said lens elements; and

developing and fixing the exposed photosensitive film band so as to form thereon recordings of the partial images formed by each photograph in the form of discontinuous parallel lines or stripes which together may be reproduced through a plurality of lens elements identical to those used for taking said photographs and having the planar faces thereof in contact with the developed and fixed film as a full image of the object of each photograph at a point corresponding to the position of the optical center of the objective lens during the taking of that photograph.

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3,978,501

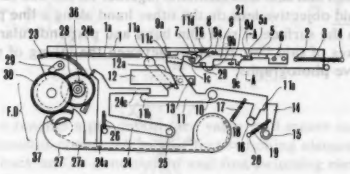
## DEVICE FOR SETTING CAMERA

Noriaki Sanada, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1974, Ser. No. 516,571
Claims priority, application Japan, Oct. 29, 1973, 48-121405[U]; Feb. 19, 1974, 49-19816[U]
Int. Cl.[2] G03B 17/42
U.S. Cl. 354—206 3 Claims

1. A device for setting a camera including a shutter and particularly suitable for utilizing film having one perforation per frame comprising a reciprocally movable operation member, film winding means arranged to be driven by said operation member for winding said film, a shutter member movable

to a shutter charged position for charging said shutter and to a shutter release position when said shutter is released, shutter charging means pivotally mounted upon said operation member and movable to a shutter member engaging position to charge said shutter upon actuation of said operation member and to a shutter member releasing position after movement of said shutter member to said shutter charged position, fixed cam means engaging said shutter charging means upon actuation of said operation member to wind film in said camera in order to displace said shutter charging means from said shutter member engaging position to said shutter member releasing position, and a holding lever pivotally mounted for movement to a position engaging said shutter member to hold said



shutter member in said shutter charged position after said shutter member has been moved to said shutter charged position and released by said shutter charging means and to a shutter member releasing position, said operation member being repeatedly reciprocally movable to wind film while said holding lever holds said shutter member with said shutter in said charged position, said holding lever being moved to release said shutter member and said shutter charging means being moved to said shutter member engaging position upon operation of said camera to release said shutter, said shutter charging means operating to return said shutter member to said shutter charged position upon subsequent actuation of said operating member.

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**3,978,502**

## VIEW-FINDER DEVICE FOR SINGLE LENS REFLEX CAMERA

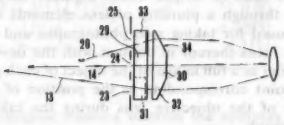
**Youichi Okuno, Yokohama, and Hideo Yokota, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Japan**

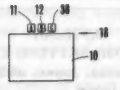
**Filed Oct. 8, 1974, Ser. No. 513,137**

**Claims priority, application Japan, Oct. 11, 1973, 48-118211**

**Int. Cl.² G03B *17/20***

**U.S. Cl. 354—225** **8 Claims**





1. In a single lens reflex camera having an objective lens, a substantially rectangular focussing screen on which the objective lens forms an image of the object, observation optics including an eye piece for viewing an image of the focussing screen, plural photographing information indicating bodies on the exterior of the camera arranged in a row extending in a direction other than parallel to one side edge of the focussing sceen and plural respective photographing information figures provided on each body along such row; a finder device, for providing images of the photographing information in said eye piece adjacent the image of said focussing screen, comprising, in combination, means, including a row of respective light admitting openings, directing light beams from said indicating bodies along respective paths into said observation optics and to said eye piece; and optical means, including a light beam deflecting member, interposed in at least one of said paths to deflect the respective light beam in a direction laterally of the image of said one side edge of said focussing screen and with an orientation towards said eye piece such that the images of the photographing information appear in a row extending substantially parallel to and along the image of said one side edge of said focussing screen.

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**3,978,503**

## LIGHT SHIELD MECHANISM FOR QUADRILATERAL OPENING

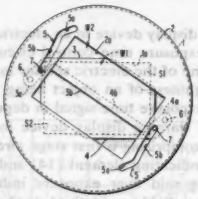
**Tetsuji Shono, Saitama, Japan, assignor to Asahi Kogaku Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 1, 1975, Ser. No. 618,599**

**Claims priority, application Japan, Oct. 4, 1974, 49-120084[U]**

**Int. Cl.² G03B *9/00*; G05D *25/00***

**U.S. Cl. 354—250** **4 Claims**



1. A light shield mechanism for selectively closing off a light path through a first window within a relatively fixed member, said mechanism comprising:

a rotatable member mounted coplanar to said first member for rotation about an axis passing through said first window and having an opening therein forming a second window, and

shield blades mounted for rotation on said fixed member to respective sides of said windows and responsive to relative rotation of said fixed and rotatable members to rotate towards each other to selectively close off said first window with said first and second windows being of such size, location and configuration that rotation of said rotatable member relative to said fixed member causes said rotatable member to partially overlap a portion of said first window with the remainder of said first window being covered by said blades.

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**3,978,504**

## PHOTOGRAPHIC SUPERIMPOSITION DEVICE

**Otto G. Cerny, Chicago, Ill., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Dec. 16, 1974, Ser. No. 532,992**

**Int. Cl.² G03B *17/26***

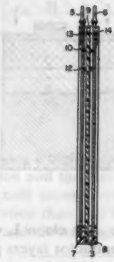
**U.S. Cl. 354—285** **2 Claims**

1. A photographic superimposition device for maintaining photographic film in superimposed mutual position, said superimposition device comprising

a film holder having a substantially rectangular frame having a first pair of spaced substantially parallel members and a second pair of spaced substantially parallel members substantially perpendicular to the first pair of members and affixed thereto to form a substantial rectangle, each member of the first pair of members and one mem-

ber of the second pair of members having slots formed therein on the inside of the rectangle for accommodating shutters in the frame in spaced parallel relation;

a substantially planar opaque partition in the frame between the slots formed therein and shutters therein and spaced from shutters in the slots;



a plurality of rigid pins in the partition and extending from both sides thereof substantially perpendicularly thereto for maintaining film in position in the spaces between the partition and shutters in the slots; and

photographic film having holes formed therethrough in correspondence with the positions of the pins for accommodating said pins whereby an object may be superimposed on any desired background on a single piece of film.

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**3,978,505**

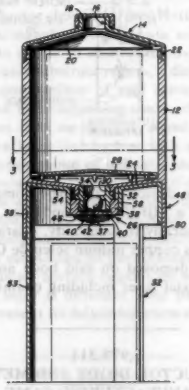
**PHOTOGRAPHIC PROCESSING TANK**

**Al Lever, 12607 Waverly Place, Bowie, Md. 20715**

**Filed Jan. 24, 1975, Ser. No. 543,758**

**Int. Cl.² G03D** *17/00*

**U.S. Cl. 354—307** **7 Claims**



1. A normally light tight photographic processing device comprising:

a tank comprising a generally open top tubular body having a generally imperforate bottom wall and a removable top closure provided with a light tight processing fluid inlet;

drain valve means in said bottom wall;

support means adapted to be operatively coupled to said tank for supporting said tank above a support surface; and

means carried by said support means for coaction with said drain valve means to operate said drain valve means by relative movement between said tank and said support means.

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**3,978,506**

**APPARATUS AND METHOD FOR NEUTRALIZING WASTE PHOTOGRAPHIC FLUIDS**

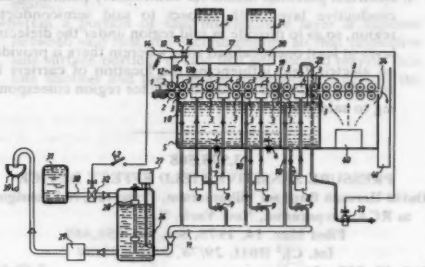
**Erwin Geyken, and Franz Ertl, both of Munich, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Dec. 5, 1974, Ser. No. 530,050**

**Claims priority, application Germany, Dec. 7, 1973, 2361150**

**Int. Cl.² G03D** *3/02*

**U.S. Cl. 354—324** **19 Claims**



2. In a photographic apparatus for processing films or analogous sheet-or web-like carriers of photosensitive material, a combination, comprising a plurality of work stations each containing a supply of a processing fluid; means for transporting carriers through respective ones of said work stations so as to be processed by the processing fluids therein, whereby the latter become spent; means for discharging spent processing fluids from the respective work stations; a container adapted to receive said spent processing fluids which are discharged from said work stations and which require neutralization; a supply of neutralizing fluid; and control means for admitting a predetermined quantity of said neutralizing fluid into said container from said supply of neutralizing fluid as a function of the quantity of carriers transported through said work stations.

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**3,978,507**

**ELECTROLUMINESCENT DEVICE HAVING LOCALIZED EMISSION**

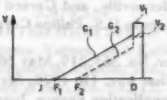
**Jacques Fertin, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 377,891, July 10, 1973, abandoned. This application May 16, 1975, Ser. No. 578,168**

**Claims priority, application France, July 13, 1972, 72.25492**

**Int. Cl.² H01L** *33/00*

**U.S. Cl. 357—17** **11 Claims**



1. A monolithic electroluminescent device, comprising:

a. a semiconductor body;

b. a semiconductor region disposed at said body and having electrical characteristics different from said body to form

a rectifying junction therewith, said region comprising radiative recombination centers so as to have electroluminescent properties when minority charge carriers are injected thereinto;

c. electrode means provided to said body and said region for electrical connection thereof to a source of electrical energy;

d. a dielectric layer disposed at and extending on said region parallel to said junction;

e. a conductive layer disposed at and partially covering a surface of said dielectric layer, said dielectric layer being disposed between said region and said conductive layer; and

f. electrical potential means for controllably polarizing said conductive layer with respect to said semiconductor region, so as to provide in said region under the dielectric layer at least one localized zone wherein there is provided on electric field influencing the location of carriers injected in a part of said semiconductor region corresponding to said zone.

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**3,978,508**

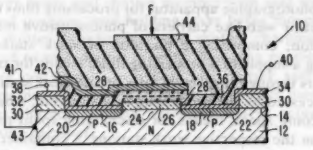
**PRESSURE SENSITIVE FIELD EFFECT DEVICE**

**David Herman Raphael Vilkomerson, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 14, 1975, Ser. No. 558,469**

**Int. Cl.² H01L 29/78, 27/20, 29/84**

**U.S. Cl. 357—26** **7 Claims**




1. A pressure sensitive field effect device which is a part of a semiconductor integrated circuit which comprises:

a first region and a second region in a body of semiconductor material, adjacent to a surface of said body and separated therein by a channel region, said channel region having a relatively thin insulating layer disposed thereover;

resilient, compressible, electric field producing means disposed on said relatively thin insulating layer in continuous contact therewith, over said channel region, said resilient, compressible, electric field producing means being an elastomer which is also an electret;

a counter electrode disposed over said channel region; and

means providing a conductive path from said counter electrode to said body.

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**3,978,509**

**PHOTOSENSITIVE SEMICONDUCTOR DEVICE**

**Christian Gouin, Herouville, and Gerard Gimine, Caen, both of France, assignors to U.S. Philips Corporation, New York, N.Y.**

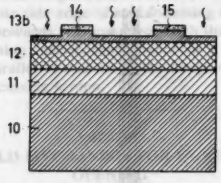
**Continuation of Ser. No. 365,219, May 30, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,221**

**Claims priority, application France, June 2, 1972, 72.19924**

**Int. Cl.² H01L 27/14, 29/167**

**U.S. Cl. 357—30** **10 Claims**

1. A semiconductor device having a photosensitive semiconductor element comprising a semiconductor body having a monocrystalline substrate region of low resistivity, and epitaxial photosensitive layer of doping material-compensated semiconductor material of a very high resistivity, an epitaxial intermediate layer disposed directly between and having a resistivity which lies between that of said substrate region and said photosensitive layer, an epitaxial semiconductor surface layer of low resistivity disposed over and at least partly covering said photosensitive layer, a first non-rectifying electrical contact on said substrate region, and a second non-rectifying electrical contact for said photosensitive layer.




2. A semiconductor device as in claim 1, wherein said substrate region and said semiconductor layers provided thereon are all n-type and said photosensitive layer consists essentially of a semiconductor material which is compensated with a doping material having an active energy level near the center of the forbidden band of said semiconductor material.

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**3,978,510**

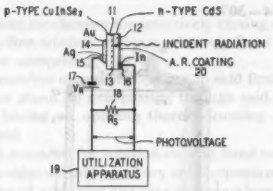
**HETEROJUNCTION PHOTOVOLTAIC DEVICES EMPLOYING I-III-VI COMPOUNDS**

**Horst Manfred Kasper, Warren; Piero Migliorato, Matawan; Joseph Leo Shay, Marlboro, and Sigurd Wagner, Holmdel, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed July 29, 1974, Ser. No. 492,394**

**Int. Cl.² H01L 27/14**

**U.S. Cl. 357—30** **8 Claims**




1. A photovoltaic device of the type comprising a *p*-type crystalline body of a I-III-VI semiconductor, and means for coupling photovoltaically to said body, characterized in that said body comprises copper indium selenide $CuInSe_2$, and the coupling means is disposed on said body and comprises an *n*-type hetero-epitaxial layer including cadmium sulfide CdS semiconductor.

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**3,978,511**

**SEMICONDUCTOR DIODE AND METHOD OF MANUFACTURING SAME**

**Jean-Louis Digoy, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.**

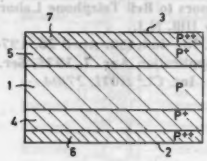
**Continuation of Ser. No. 381,015, July 20, 1973, abandoned. This application July 22, 1974, Ser. No. 490,409**

**Int. Cl.² H01L 27/14**

**U.S. Cl. 357—30** **5 Claims**

1. A diode comprising a semiconductor body having at least first and second adjoining regions of the same conductivity type, said first region containing a portion of a second conductivity type so as to provide a diode junction within the first region, said first region having a high resistivity and the second region having a high doping impurity concentration, said

second region exhibiting a doping impurity concentration increasing with increasing distance from the interface between said first and second regions, said second region comprising first and second adjoining zones, the first zone adjoining said




first region and having a higher doping impurity concentration than said first region and the second zone being remote from said first region, said second zone having a higher doping impurity concentration than said first zone, wherein the thicknesses of said first and second regions are substantially equal.

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**3,978,512**

## SEMICONDUCTOR DEVICE FOR CONVERTING A RADIATION PATTERN INTO ELECTRIC SIGNALS

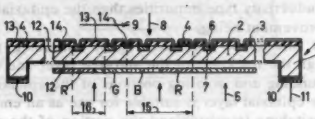
**Arthur Marie Eugene Hoeberechts, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 5, 1973, Ser. No. 329,469**

**Claims priority, application Netherlands, Feb. 25, 1972, 7202478**

**Int. Cl.² H01L *27/14, 31/00***

**U.S. Cl. 357—31** **15 Claims**




**1. A semiconductor device for converting a radiation pattern into electric signals, comprising a semiconductor body having a substrate region of one conductivity type, a conductor connected to said substrate region, a dielectric layer covering portions of one surface of said semiconductor body, a radiation-sensitive layer adjoining said surface for converting incident radiation into an electric signal by scanning said radiation-sensitive layer line-by-line with a beam of charged particles, at least one group of indicator members on the side of the said surface and, in the direction of the line scan, forming regions which are present at regular intervals and which have an acceptance for the scanning beam which differs from that of the remaining part of the body, said indicator members being electrically connected to the substrate region and comprising semiconductor surface regions on which the thickness of the dielectric layer is different from the thickness of the dielectric layer present on adjoining parts of the semiconductor surface.**

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**3,978,513**

## SEMICONDUCTOR CONTROLLED RECTIFYING DEVICE

**Yoshio Terasawa, Hitachi, Japan, assignor to Hitachi, Ltd., Japan**

**Continuation of Ser. No. 253,886, May 16, 1972, abandoned. This application July 11, 1974, Ser. No. 487,723**

**Claims priority, application Japan, May 21, 1971, 46-34048; Aug. 30, 1971, 46-65892**

**Int. Cl.² H01L *29/74***

**U.S. Cl. 357—38** **11 Claims**

**1. A semiconductor controlled rectifying device comprising:**

**a semiconductor substrate having a four-layer structure consisting of alternate P- and N-type layers, one of the outermost layers having a first region and a second region which has a smaller area than said first region and which is separated from said first region by a predetermined distance;**

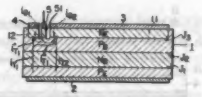
**a first main electrode kept in ohmic contact with said first region;**

**a second main electrode kept in ohmic contact with the other of said outermost layers;**

**a conductive layer kept in contact with said second region, which is electrically isolated from said first main electrode; and**

**trigger means provided between said first and second regions,**

**wherein a portion of said intermediate layer is exposed between said first and second regions so that respective side surface portions of said first and second regions face one another and the distance therebetween defines the**




**width of the exposed portion of said intermediate layer, and wherein said trigger means has a gate electrode coupled to the exposed portion of said intermediate layer, with the width of the exposed portion of the intermediate layer at the portions thereof other than where said gate electrode is coupled thereto being uniform, and the height of said respective side surface portions of said first and second regions being uniform,**

**whereby the parts of the four layers which are closest to the trigger means and have said first region and said second region as an outermost layer, respectively, are simultaneously turned on by a trigger signal supplied from the trigger means and then at least remaining parts of the four layers, which have said first region as an outermost layer and are spaced apart from the four layers which have said second region as an outermost layer, are turned on by means of the load current resulting from the turn-on of the four layers which have said second region as an outermost layer.**

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**3,978,514**

## DIODE-INTEGRATED HIGH SPEED THYRISTOR

**Takuzo Ogawa; Tsutomu Yatsuo, and Keiichi Morita, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Continuation-in-part of Ser. No. 55,313, July 16, 1970, abandoned. This application Feb. 13, 1974, Ser. No. 442,242**

**Claims priority, application Japan, July 18, 1969, 44-56464; July 6, 1973, 48-56462**

**Int. Cl.² H01L *29/747***

**U.S. Cl. 357—39** **8 Claims**

**1. A diode-integrated thyristor device comprising:**

**(i) a disc-shaped semiconductor body having two opposing principal surfaces and including**

a. a first inner layer of a first conductivity type having a central portion exposed to one of said two opposing principal surfaces,

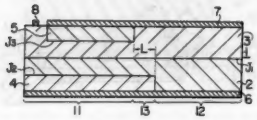
b. a second inner layer of a second conductivity type, opposite said first conductivity type, having a central portion exposed on the other of said two opposing principal surfaces and disposed in contact with said first inner layer and defining therewith a first PN junction with extends laterally throughout said body,

c. a first ring-shaped outer layer of said second conductivity type, formed in said first inner layer and defining therewith a second PN junction which terminates at said one principal surface and adjoins said central portion of said first inner layer;

d. a second outer layer of said first conductivity type, formed in said second inner layer and defining therewith a third PN junction, an edge portion of which terminates at said other principal surface, adjoins said central portion of said second inner layer, and is circularly shaped;

ii. a first electrode in ohmic contact on said one principal surface with the entirety of said central portion of said first inner layer and with the surface of said first outer layer;

iii. a second electrode in ohmic contact on said other principal surface with the entirety of said central portion of said second inner layer and with the surface of said second outer layer; and




iv. control means, coupled to one of the first and second inner layers, for supplying a trigger signal thereto; and

wherein

a four layer body region is defined by those portions of each of said inner and outer layers, the projections of which onto said principal surfaces overlap one another,

a two layer body region is defined by those portions of each of said inner layers exclusive of said outer layers, the projections of which onto said principal surfaces overlap one another,

said four layer body region, said first and second electrodes and said control means defining a ring-shaped thyristor which conducts current through the periphery of said body in a first direction,

said two layer body region and said first and second electrodes defining a diode rectifire which conducts current through the center of said body in a second direction, opposite said first direction, and

a ring shaped separation body region is defined by those portions of each of said inner layers and said second outer layer, the projections of which onto said principal surfaces overlap one another and adjoin both said four layer body region and said two layer body region, the width of said ring-shaped separation body region separating said four layer body region from said two layer body region being such as to prevent load current from flowing in said ring-shaped separation body region and so that the charge concentration due to current flow in said diode rectifier does not extend into said four layer body region.

**3,978,515**

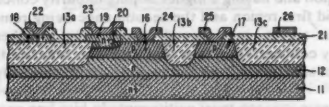
## INTEGRATED INJECTION LOGIC USING OXIDE ISOLATION

**William Joshua Evans; Wesley Norman Grant, both of Berkeley Heights, and Bernard Thomas Murphy, New Providence, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Division of Ser. No. 464,480, April 26, 1974, Pat. No. 3,904,450. This application Apr. 7, 1975, Ser. No. 565,801**

**Int. Cl.² H01L *27/04***

**U.S. Cl. 357—44** **8 Claims**




7. In a semiconductor integrated injection logic cell structure comprising an injector transistor and a switching transistor formed in a semiconductor epitaxial layer of a first conductivity type disposed on a semiconductor bulk portion of the same conductivity type and having a higher concentration of first conductivity type impurities than the epitaxial layer,

the improvement being:

at least one oxide isolation region extending partially through the thickness of the epitaxial layer and laterally surrounding and isolating portions of the epitaxial layer so the epitaxial layer is suitable for use as an emitter for the switching transistor and the portion of the epitaxial layer and the remaining thickness is suitable for use as a lateral base for the injection transistor

zones of impurities of a second conductivity type formed into the portions of the epitaxial layer laterally surrounded by the oxide isolation region where a first such zone is suitable for use as an emitter for the injection transistor and a second such zone is suitable for use both as a collector for the injection transistor and a base for the switching transistor

at least one pocket of first type conductivity impurities formed in said second zone for use as a collector for the switching transistor and contact means for reverse biasing the collector-base-junction of the switching transistor, contact means for supplying current to the emitter of the injection transistor and thereby forward biasing the emitter of the injection transistor, and contact means for supplying signals to the base of the switching transistor for controlling the conduction of the switching transistor.

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**3,978,516**

## LEAD FRAME ASSEMBLY FOR A PACKAGED SEMICONDUCTOR MICROCIRCUIT

**Terry Wayne Noe, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 320,349, Jan. 2, 1974. This application Feb. 4, 1974, Ser. No. 439,460**

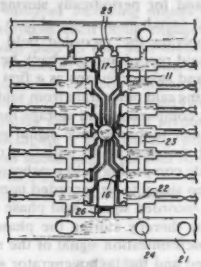
**Int. Cl.² H01L *23/48, 29/44, 29/52, 29/60***

**U.S. Cl. 357—70** **2 Claims**

2. A laminated, thin-film interconnect pattern composite for use in the assembly of integrated circuits comprising:

a rolled copper alloy film patterned on a flexible strip of

synthetic resin, and laminated thereto with a high temperature polyamide resin adhesive said alloy film comprising



a plurality of symmetrical leads having terminals arranged in parallel rows along the edges of said resin strip.

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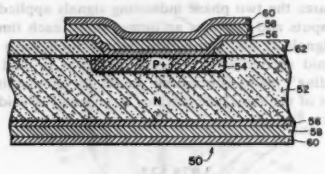
**3,978,517**

## TITANIUM-SILVER-PALLADIUM METALLIZATION SYSTEM AND PROCESS THEREFOR

**Gene Edgar Brown, Rolling Meadows, Ill., and Richard Leslie Greeson, Scottsdale, Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Filed Apr. 4, 1975, Ser. No. 565,166**
**Int. Cl.² H01L** *23/48, 29/46, 29/54, 29/62*
**U.S. Cl. 357—71** **1 Claim**



1. A glass encapsulated double-plug diode comprising a semiconductor substrate, said substrate having disposed thereon successive layers of titanium, silver and palladium.

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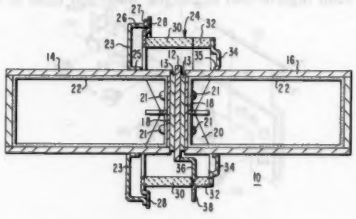
**3,978,518**

## REINFORCED TRANSCALENT DEVICE

**Sebastian William Kessler, Jr., and Robert Franklin Keller, both of Lancaster, Pa., assignors to RCA Corporation, New York, N.Y.**

**Filed Nov. 12, 1975, Ser. No. 631,324**
**Int. Cl.² H01L** *23/02, 23/12, 23/42, 25/04*
**U.S. Cl. 357—82** **8 Claims**



1. A transcalent device comprising:
two closed heat pipes;
a semiconductor device sandwiched between the two heat pipes so that each heat pipe is in thermal and electrical contact with the semiconductor device;
fastening means for compressing the wafer between the two heat pipes; and
reinforcements within each heat pipe to prevent the ends, which are adjacent the semiconductor device, from buckling.

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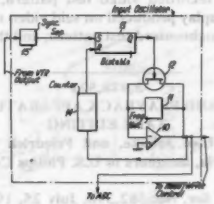
**3,978,519**

## DIGITAL TIME BASE CORRECTORS FOR TELEVISION EQUIPMENT

**Anthony Donald Stalley, and John Albert Coffey, both of Newbury, England, assignors to Quantel Limited, England**

**Filed Mar. 13, 1975, Ser. No. 558,091**
**Claims priority, application United Kingdom, Mar. 16, 1974, 11794/74**
**Int. Cl.² H04N** *5/76, 9/46*
**U.S. Cl. 358—8** **10 Claims**



1. A digital time base corrector for television equipment comprising:
a. an analogue to digital converter for receiving successive lines of an analogue video signal having horizontal sync pulse information thereon and for converting said signal into digital form;
b. a store for receiving the video information in digital form from the output of the analogue to digital converter;
c. control means for writing in and reading out the digital information in said store;
d. a digital to analogue converter for receiving the signal read out from said store;
e. a fixed frequency input oscillator for determining the rate of conversion of said analogue signal into digital form and the rate of writing in of said digital information into said store;
f. a fixed frequency output oscillator for determining the rate of reading out of the digital information from said store, and the rate of conversion of the digital information into analogue form; and
g. said input oscillator including a triggered oscillator having an input connected to said incoming video signal which oscillator is triggered into oscillation in timed relationship with the incoming horizontal sync pulse information, said input oscillator including means connected to the output of the triggered oscillator to switch off said oscillator after emission of a predetermined number of oscillations therefrom which are sufficient to cause all the video information in one line to be converted into digital form and stored.

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**3,978,520**

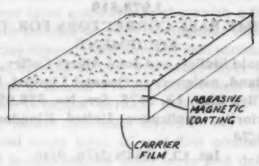
## MAGNETIC HEAD CLEANING TAPE AND METHOD

**John V. Nowicki, St. Paul, and John D. Hakanson, South St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Nov. 29, 1974, Ser. No. 528,354**
**Int. Cl.² G11B** *5/11*
**U.S. Cl. 358—10** **7 Claims**

1. Method of cleaning the magnetic heads of a video tape recorder having a video monitor, comprising playing in said recorder a magnetically recordable magnetic head cleaning

tape having a surface coating comprising magnetizable particles in a hard non-magnetizable binder, said coating having an $H_c$ value of at least 300 oersteds and a $B_r$ value of at least 800 gauss, and having a surface roughness of between $5 \times 10^{-2}$ and $12 \times 10^{-2}$ (arithmetic average) and between $20 \times 10^{-2}$ and 47




$\times 10^{-2}$ (peak-to-valley) micro-meters, and said tape carrying a magnetically recorded video test pattern; continuing the play until the display produced on said video monitor resolves into the clear synchronized test pattern; and then immediately stopping play.

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**3,978,521**

## RECORDING AND PLAYBACK APPARATUS FOR VIDEO TAPE EDITING

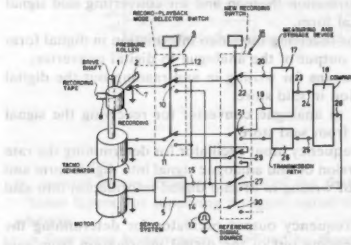
**Erich Langer; Uwe Jahnke, and Friedrich Sommer, all of Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 382,398, July 25, 1973, abandoned. This application Feb. 21, 1975, Ser. No. 551,639**

**Claims priority, application Austria, Aug. 23, 1972, 7277/72**

**Int. Cl.² G11B 27/32**

**U.S. Cl. 360—14** **10 Claims**



1. A recording and playback apparatus for video signals, of the type having "record", "playback" and "new recording" modes, comprising a drive shaft for moving a record carrier; a servo system for controlling the speed of the drive shaft; a tachogenerator connected to the drive shaft for supplying a pulse train having a frequency and phase proportional to the speed and angular position of the drive shaft; a recording and playback head;

first switch means operable in said "record" mode for applying field synchronization pulses of a first video signal to be recorded to said recording and playback head to record said field synchronization signals on a field synchronization track and for applying said tachogenerator pulse train to said servo system as a measuring signal; terminal means for applying said field synchronization pulses from said first video signal to be recorded to said servo system as a reference signal;

said terminal means further comprising means for receiving reference signal pulses and for applying said reference signal pulses to said servo system in said "playback" mode as a reference signal; said first switch means further comprising means operable in said "playback" mode for disconnecting said tachogenerator from said servo system and for connecting said record and playback head to said servo system to utilize said recorded field synchronization pulses as a measuring signal; phase comparison and storage means for comparing the phase of two applied pulsatory signals and for periodically storing said compared phase; second switch means operable in said "playback" mode for applying the recorded field synchronization pulses from said record and playback head to said phase comparison and storage means as a first pulsatory signal and for applying said pulse train from said tachogenerator to said phase comparison and storage means as a second pulsatory signal; said reference signal pulses applied to said terminal means prior to initiation of said "new recording" mode comprising field synchronization pulses of a second video signal to be recorded immediately following said first recorded signal, said phase comparison and storage means thereby storing the phase difference between the synchronization signal of the new video signal to be recorded and the tachogenerator signal;

said second switch means further comprising means operable in said "new recording" mode for deactivating the comparison function of said phase comparison and storage means whereby the phase difference between the tachogenerator signal and the field synchronization pulses of the new video signal to be recorded, is stored; a signal comparator; means connecting the stored phase difference from said phase comparison and storage means to an input of said signal comparator; transmission path means for connecting the output of said tachogenerator to an input of said signal comparator whereby said transmission path means provides an output signal corresponding to the momentary phase of the pulse train supplied by the tachogenerator, and whereby the signal comparator compares the two phase indicating signals applied to its two inputs and provides an output pulse each time said two signals at said comparator inputs equal each other; and said second switch means operable in said "new recording" mode comprising means for connecting the output of the signal comparator to an input of said servo system.

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**3,978,522**

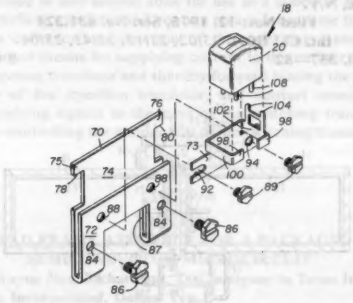
## METHOD AND APPARATUS FOR MOUNTING A CASSETTE RECORD-PLAYBACK HEAD

**Kurt Rothlisberger, Morton Groove, and Richard F. Vee, Chicago, both of Ill., assignors to Teletype Corporation, Skokie, Ill.**

**Continuation of Ser. No. 479,679, June 14, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,764**

**Int. Cl.² G11B 5/48, 21/24, 5/54, 5/56**

**U.S. Cl. 360—104** **7 Claims**




1. An apparatus for accurately positioning a record-playback head with respect to an informational-tape carried within a tape cassette positioned on a cassette recorder comprising:

a pair of spacially oriented axially parallel cassette guide pins which serve to accurately locate the cassette in the recorder;

a support member including means for mounting the playback-record head in a fixed, predetermined position thereon;

said support member including means defining a pair of reference surfaces each being engaged with one of said cassette guide pins so that said mounting means is oriented with respect to said guide pins and thus a playback-record head carried thereon will be oriented with respect to the informational tape carried within the cassette;

means mounting said cradle for pivotal movement;

said cradle including a substantially planar wall with the plane thereof substantially parallel to the plane of a cassette received therein and

means securing said support member to said wall of said cradle.

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3,978,523

## MULTI-CHANNEL DUAL-GAP MAGNETIC HEAD

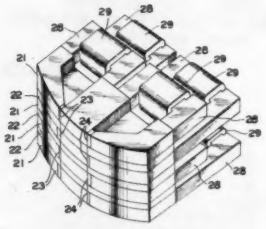
**Takashi Tanaka, Osaka, and Yasuo Nomura, Nishinomiya, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 205,074, Dec. 6, 1971, abandoned, which is a division of Ser. No. 16,320, March 4, 1970, Pat. No. 3,672,044. This application Nov. 13, 1973, Ser. No. 415,397**

**Claims priority, application Japan, Mar. 10, 1969, 44-19680**

**Int. Cl.² G11B *5/28, 5/25***

**U.S. Cl. 360—121** **2 Claims**



1. A multi-channel dual-gap magnetic head comprising a stack of plurality of magnetic head tips each having two magnetic gaps with each gap having a width for carrying out a function from among the functions of recording, playback, and erase and combinations thereof, a non-magnetic material between each two magnetic head tips magnetically separating them; a plurality of magnetic back cores joined to said plurality of magnetic head tips; and a plurality of windings wound on the respective back cores, said magnetic gaps of said plurality of head tips being aligned in two straight lines parallel to each other and perpendicular to the direction of tape movement past the multi-channel dual-gap magnetic head, and some of the magnetic gaps aligned in one straight line having a width for carrying out one of the functions and at least some of the remainder of the gaps in the one straight line having a different width for carrying out another of the functions.

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3,978,524

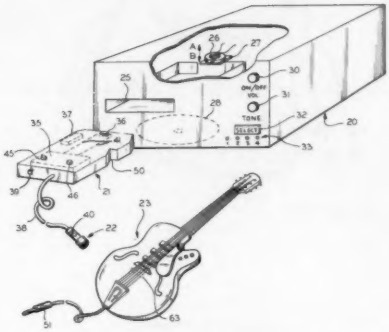
## ADAPTER FOR PLAYING REMOTELY LOCATED ELECTRONIC APPARATUS THROUGH A MAGAZINE TAPE RECORDER/REPRODUCER

**Bernard Gordon, 1745 W. Devon Ave., Chicago, Ill. 60660, and Hugo G. Hernandez, 7019 W. Diversey, Chicago, Ill. 60635**

**Filed Sept. 3, 1974, Ser. No. 502,778**

**Int. Cl.² G11B *31/00, 23/00;* H04M *1/00***

**U.S. Cl. 360—137** **11 Claims**



1. An adapter for playing remotely located electronic apparatus through a magazine type magnetic player/recorder having a pick-up head, said adapter being housed in a standard magazine housing, said adapter comprising input connector means on said magazine housing for connection to the remotely located electronic apparatus to receive output signals therefrom, electronic preamplification circuit means connected to said input connector means, inductor winding means coupled to said electronic preamplification circuit means, said inductor winding being located at a position in said housing to couple with said pick-up head when said magazine housing is operatively mounted on said player/recorder, means for varying the impedance of said electronic preamplification circuit means as a function of the impedance of the particular electronic apparatus attached to said input connector means of said adapter to provide an impedance match, and d.c. power source means for independently powering said electronic preamplification circuit means.

# DESIGN PATENTS

## GRANTED AUGUST 31, 1976

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 016–083 | 241,271 |
| 016–042 | 241,273 |

# DESIGN PATENTS

## GRANTED AUGUST 31, 1976

### ERRATA

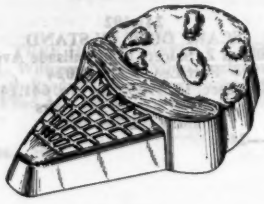
| Pat. CLASS | Pat. PATENT NO. |
|---|---|
| 016-083 | 241,271 |
| 016-042 | 241,272 |

# DESIGNS

## AUGUST 31, 1976

241,183
**EXPANDED CEREAL FOOD PRODUCT**
John A. Comollo, St. Louis, Mo., assignor to Ralston Purina Company, St. Louis, Mo.
Filed Feb. 7, 1975, Ser. No. 541,471
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—18

241,184
**ANIMAL BISCUIT OR THE LIKE**
Harold S. French, 60 E. 8th St., New York, N.Y. 10003
Filed Feb. 10, 1975, Ser. No. 548,609
Term of patent 7 years
Int. Cl. D1—*01*
U.S. Cl. D1—27

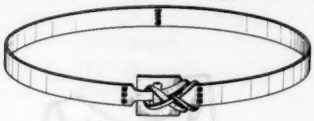


241,185
**GARMENT**
Jean V. Schlechter, 3016 Northway Drive, Baltimore, Md. 21234
Filed Aug. 14, 1974, Ser. No. 497,480
Term of patent 3½ years
Int. Cl. D2—*02*
U.S. Cl. D2—82

241,186
**APRON**
Doris Brosk, 150 E. 69th St., New York, N.Y. 10021
Filed Dec. 19, 1974, Ser. No. 534,571
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—227

241,187
**APRON**
Doris Brosk, 150 E. 69th St., New York, N.Y. 10021
Filed Dec. 19, 1974, Ser. No. 534,572
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—227

241,188
**BELT**
Samuel W. T. Lanham, 2004 Fulham Court, Houston, Tex. 77042
Filed Mar. 14, 1975, Ser. No. 558,238
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—380



241,189
**CARD HOLDER FOR ATTACHMENT TO BRAS AND THE LIKE**
Joan M. Clark, 1517 W. 35th Place, Los Angeles, Calif. 90018
Filed Mar. 20, 1975, Ser. No. 560,297
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400

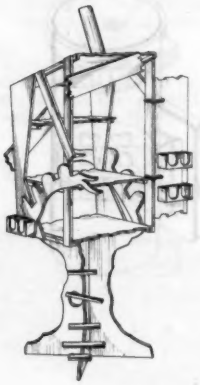
241,190
**CHILD'S ROCKER CHAIR**
Herbert G. Blinn, 9645 Wheatland Ave., Sunland, Calif. 91040
Filed June 10, 1974, Ser. No. 477,807
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—11

241,191
**ADJUSTABLE SUPPORT STAND FOR AN ENGINE PERFORMANCE INSTRUMENT OR SIMILAR ARTICLE**
Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.
Filed Dec. 12, 1974, Ser. No. 532,760
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—20

241,192
**SCARF DISPLAY STAND**
William Z. Salcer, 1500 Palisade Ave., Fort Lee, N.J. 07024
Filed Dec. 15, 1975, Ser. No. 641,141
Term of patent 3½ years
Int. Cl. D20—*02*
U.S. Cl. D6—24

241,193
**CHAIN DISPLAY STAND**
William Z. Salcer, 1500 Palisade Ave., Fort Lee, N.J. 07024
Filed Dec. 15, 1975, Ser. No. 640,875
Term of patent 3½ years
Int. Cl. D20—*02*
U.S. Cl. D6—28

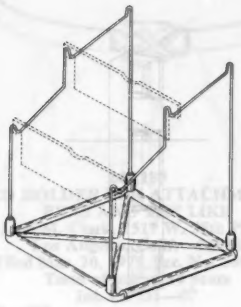
241,194
**TREE HOUSE DISPLAY CASE**
Robert L. Williams, Edina, Minn., assignor to Village Bath Products, Inc., Minnetonka, Minn.
Filed Apr. 30, 1975, Ser. No. 573,039
Term of patent 14 years
Int. Cl. D70—*02*
U.S. Cl. D6—29



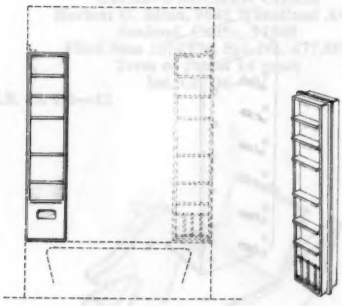
241,195
**TUBE HOLDER FOR USE WITH A COMBINED SPLASH GUARD AND HOLDER FOR BATHROOM ACCESSORIES**
Stephen J. Baumrind, Charleston, S.C., assignor of a fractional part interest to Larry Harold Kline, Charleston, S.C.
Filed Mar. 2, 1973, Ser. No. 337,389
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—87

241,196
**EYEGLASS DISPLAY UNIT**
Richard S. Dunchock, Northville, Mich., assignor to Optarac Corporation, Hollywood, Fla.
Filed Aug. 19, 1974, Ser. No. 498,542
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85

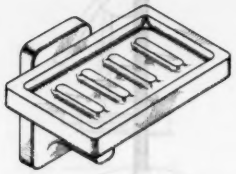
241,197
**MERCHANDISE DISPLAY RACK**
Douglas G. Covell, Upper Arlington, and Charles A. Wells, Marysville, Ohio, and Michael C. Wilson, Glen Ellyn, Ill., and Raymond A. Krusinski, Gahanna, Ohio, assignors to Pretty Products, Inc., Coshocton, Ohio
Filed Mar. 17, 1975, Ser. No. 558,637
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—85



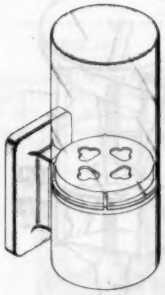
241,198
**STORAGE UNIT FOR BATHROOMS OR THE LIKE**
Albert L. Busch, La Puente, Calif., and Marilyn Thompson, 2212 El Monte Ave., Arcadia, Calif. 91006, administratrix of said Albert L. Busch, deceased
Filed Nov. 21, 1974, Ser. No. 525,933
Term of patent 14 years
Int. Cl. D6—*04;* D23—*02*
U.S. Cl. D6—86



241,199
**COMBINED SOAP DISH AND MOUNTING BRACKET THEREFOR**
Milton Halsted, Long Beach, Ivan A. McIntyre, Westminster, David Y. Muramatsu, Costa Mesa, and James P. Sullivan, Tustin, Calif., assignors to Chicago Specialty Manufacturing Company, Skokie, Ill.
Filed June 3, 1975, Ser. No. 583,511
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—90

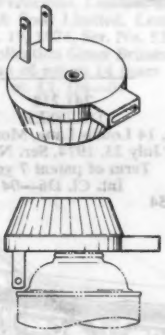


241,200
**COMBINED TOOTHBRUSH HOLDER AND MOUNTING BRACKET THEREFOR**
Milton Halsted, Long Beach, Ivan A. McIntyre, Westminster, David Y. Muramatsu, Costa Mesa, and James P. Sullivan, Tustin, Calif., assignors to Chicago Specialty Manufacturing Company, Skokie, Ill.
Filed June 4, 1975, Ser. No. 583,755
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—94

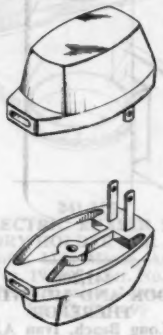


241,201
**HOT LATHER DISPENSER**
Douglas A. Long, Wilton, and Frederick A. Burke, Riverside, Conn., assignors to Clairol Incorporated, New York, N.Y.
Filed Dec. 24, 1974, Ser. No. 536,066
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D6—95

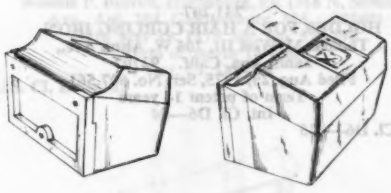
241,202
**LATHER HEATER**
Franklin C. Farnam, 19 Glenview Road, Asheville, N.C. 28804
Filed May 13, 1975, Ser. No. 575,692
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D6—95



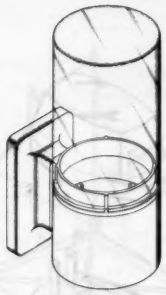
241,203
**LATHER HEATER**
Franklin C. Farnam, 19 Glenview Road, Asheville, N.C. 28804
Filed May 13, 1975, Ser. No. 575,691
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D6—95



241,204
**COMBINED DISPENSER FOR MOIST THROW-AWAY TOWELETTES AND MOUNTING BRACKET THEREFOR**
Hans Emin Sjoholm, Enskede, Sweden, assignor to Molnlycke AB, Gothenburg, Sweden
Filed Dec. 11, 1974, Ser. No. 531,457
Claims priority, application Sweden June 11, 1974
Term of patent 14 years
Int. Cl. D6—*04;* D23—*02*
U.S. Cl. D6—96

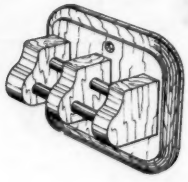


241,205
**COMBINED CUP HOLDER AND MOUNTING BRACKET THEREFOR**
Milton Halsted, Long Beach, Ivan A. McIntyre, Westminster, David Y. Muramatsu, Costa Mesa, and James P. Sullivan, Tustin, Calif., assignors to Chicago Specialty Manufacturing Company, Skokie, Ill.
Filed June 3, 1975, Ser. No. 583,502
Term of patent 14 years
Int. Cl. D6—*04;* D23—*02*
U.S. Cl. D6—115

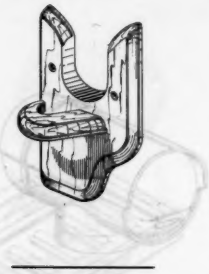


241,206
**COMBINED HOOK AND MOUNTING BRACKET THEREFOR**
Milton Halsted, Long Beach, Ivan A. McIntyre, Westminster, David Y. Muramatsu, Costa Mesa, and James P. Sullivan, Tustin, Calif., assignors to Chicago Specialty Manufacturing Company, Skokie, Ill.
Filed June 3, 1975, Ser. No. 583,275
Term of patent 14 years
Int. Cl. D8—*08;* D23—*02*
U.S. Cl. D6—120

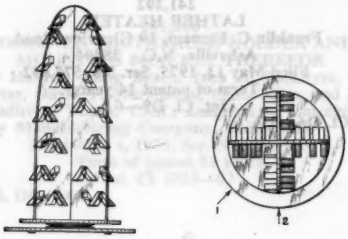
241,207
**HOLDER FOR A HAIR CURLING IRON**
Thomas M. West III, 206 W. Alton Ave., Santa Ana, Calif. 92707
Filed Aug. 25, 1975, Ser. No. 607,561
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—125



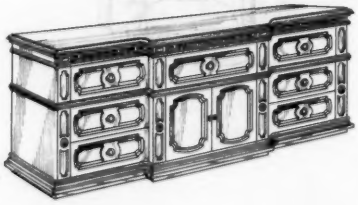
241,208
**HOLDER FOR A HAIR DRYER**
Thomas M. West III, 206 W. Alton Ave., Santa Ana, Calif. 92707
Filed Aug. 25, 1975, Ser. No. 607,560
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—125



241,209
**DISPLAY STAND FOR FINGER RINGS OR THE LIKE**
Everett Petrosinelli, Cranston, R.I., assignor to Richton International Corporation
Filed Mar. 17, 1975, Ser. No. 559,375
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—141

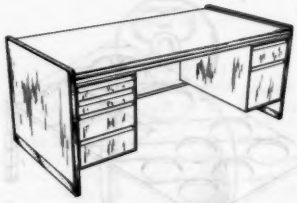


241,210
**DRESSER**
Leonard Eisen, 14 Lomas Lane, Montvale, N.J. 07645
Filed July 23, 1974, Ser. No. 491,121
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—154

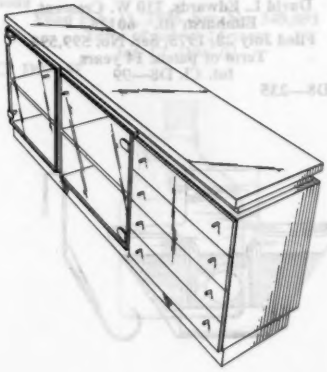


241,211
DRESSER
Leonard Eisen, 14 Lomas Lane, Montvale, N.J. 07645
Filed July 23, 1974, Ser. No. 491,124
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—154

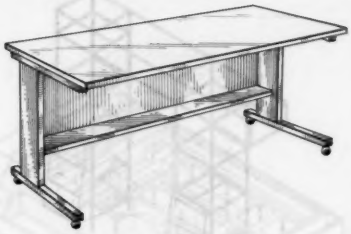
241,212
DESK
Ronald R. Hodges, Grandville, and Jack Hockenberry, Grand Rapids, Mich., assignors to Steelcase Inc., Grand Rapids, Mich.
Filed May 22, 1973, Ser. No. 362,853
Term of patent 14 years
The term of this patent subsequent to Feb. 25, 1989, has been disclaimed
Int. Cl. D6—*04*
U.S. Cl. D6—161



241,213
CABINET
Leonard Montague Fertleman, London, England, assignor to B. Fertleman & Sons Limited, London, England
Filed Dec. 19, 1974, Ser. No. 534,221
Claims priority, application Great Britain June 19, 1974
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—169



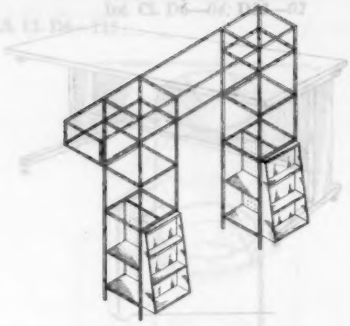
241,214
TABLE
Robert J. Szucs, Midlothian, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed Aug. 5, 1974, Ser. No. 494,801
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179



241,215
COMBINED ELECTRIC ERASER SUPPORT HOOK AND ACCESSORY HOLDER FOR A DRAFTSMAN
Dowell James Smith, 1104 Minda, Austin, Tex. 78758
Filed Nov. 19, 1974, Ser. No. 525,055
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—181

241,216
STAND FOR POTTED PLANTS AND THE LIKE
Rosalie P. Burrell, Harrisburg, Pa. (368 N. Summit Ave., Apt. 204, Gaithersburg, Md. 20760)
Filed May 19, 1975, Ser. No. 578,393
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D6—182

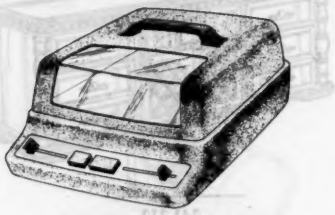
241,217
DISPLAY UNIT
Melvin Cohen, Wayne, N.J., assignor to Melrose Displays, Inc., Passaic, N.J.
Filed May 8, 1975, Ser. No. 575,749
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—186



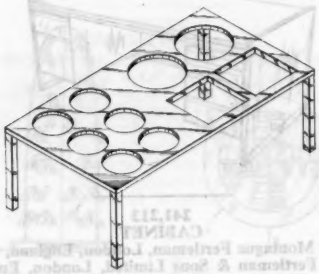
241,218
LOUNGE CHAIR FRAME
Daniel C. Harmony, 902 E. Prince Road, Tucson, Ariz. 85719
Filed Sept. 13, 1974, Ser. No. 505,665
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

241,219
POUR-IN TYPE BEVERAGE MAKER
John C. Martin, Springfield, Ill., assignor to Bunn-O-Matic Corporation
Filed Sept. 17, 1974, Ser. No. 506,878
Term of patent 14 years
The term of this patent subsequent to May 4, 1990, has been disclaimed
Int. Cl. D7—*02*
U.S. Cl. D7—62

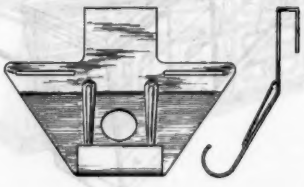
241,220
PORTABLE MICROWAVE OVEN
Thomas J. Binzer, Louisville, Ky., assignor to General Electric Company
Filed June 2, 1975, Ser. No. 582,644
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128



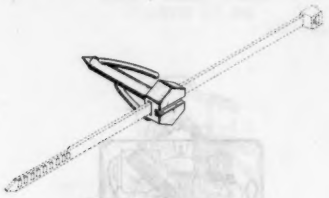
241,221
COOLER INSERT
Albert J. Cormier, 2 Sunset Ave., Woonsocket, R.I. 02895
Filed Dec. 19, 1974, Ser. No. 534,365
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—129



241,222
BICYCLE SUPPORTING HANGER OR SIMILAR ARTICLE
David L. Edwards, 210 W. Crescent, Elmhurst, Ill. 60126
Filed July 28, 1975, Ser. No. 599,598
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—235



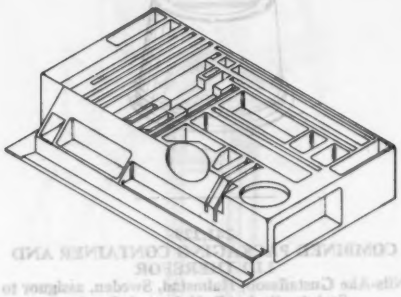
241,223
**MOLDED WALL FASTENER**
Alan J. Solo, Brooklyn, N.Y., assignor to Knock-N-Lok International, Inc., Brooklyn, N.Y.
Filed Dec. 12, 1974, Ser. No. 532,202
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—271



241,224
**BOTTLE OR THE LIKE**
Gordon Delbert Holmes, Scarborough, Ontario, Canada, assignor to Gold Seal Company, Bismarck, N. Dak.
Filed Oct. 16, 1974, Ser. No. 515,179
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—33

241,225
**BOTTLE**
Ronald Harold McCurdy, Willowdale, Ontario, Canada, assignor to Wampole Limited, Don Mills, Ontario, Canada
Filed Feb. 11, 1975, Ser. No. 549,091
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—47

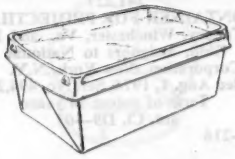
241,226
**COMPARTMENTED TRAY FOR DRAFTING SUPPLIES**
Richard W. Chatham, Rte. 10, P.O. Box 823, Sherre Lane, Greensboro, N.C. 27406
Filed Sept. 9, 1974, Ser. No. 504,305
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—185



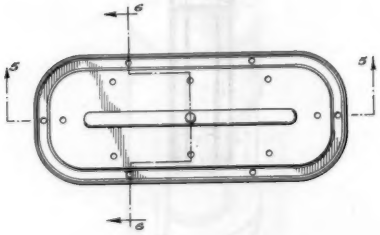
241,227
**CONTAINER FOR PROJECTILES**
Kenneth S. Tenney, Winchester, Va., and Daniel Tomes, Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.
Filed Aug. 1, 1974, Ser. No. 494,260
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216

**241,228**
**PACKAGING CONTAINER FOR FOOD OR THE LIKE**
Stanley W. Boduch, Ludlow, Mass., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Nov. 7, 1974, Ser. No. 522,082
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—220

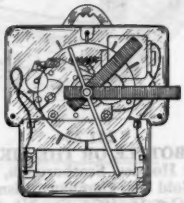
**241,229**
**COMBINED PACKAGING CONTAINER AND LID THEREFOR**
Nils-Ake Gustaffsson, Halmstad, Sweden, assignor to Sprinter Pack AB, Halmstad, Sweden
Filed June 6, 1974, Ser. No. 476,850
Claims priority, application Sweden Dec. 10, 1973
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—237



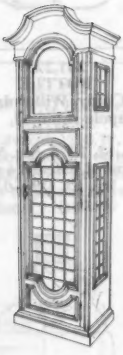
**241,230**
**INSERT FOR THE BOTTOM OF A BASKET**
Harry L. Rownd, Latta, and William E. Wallace and Thompson J. Rownd, Dillon, S.C., assignors to Rownd & Sons, Inc., Dillon, S.C.
Filed Dec. 5, 1974, Ser. No. 529,684
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—253



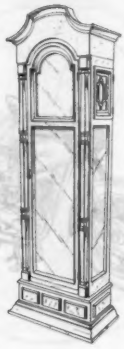
**241,231**
**CLOCK**
John Roger Simons, Delavan, Wis., assignor to Bunker Ramo Corporation, Oak Brook, Ill.
Filed Dec. 10, 1973, Ser. No. 423,153
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—1



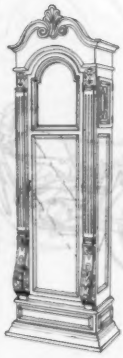
**241,232**
**CLOCK CABINET**
Warren F. Bacon, City of Industry, Gordon L. Entler, Chino, and Alan W. McKae, Corona del Mar, Calif., assignors to Molyneux Clocks
Filed Oct. 21, 1974, Ser. No. 516,648
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—16



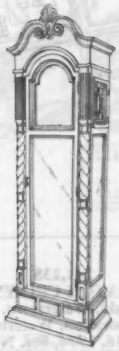
241,233
CLOCK CABINET
Warren F. Bacon, City of Industry, Gordon L. Entler, Chino, and Alan W. McKae, Corona del Mar, Calif., assignors to Molyneux Clocks
Filed Oct. 21, 1974, Ser. No. 516,650
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—16



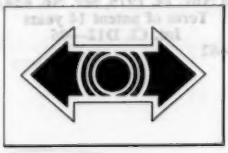
241,234
CLOCK CABINET
Warren F. Bacon, City of Industry, Gordon L. Entler, Chino, and Alan W. McKae, Corona del Mar, Calif., assignors to Molyneux Clocks
Filed Dec. 2, 1974, Ser. No. 528,886
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—16



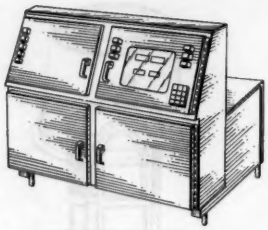
241,235
CLOCK CABINET
Warren F. Bacon, City of Industry, Gordon L. Entler, Chino, and Alan W. McKae, Corona del Mar, Calif., assignors to Molyneux Clocks
Filed Dec. 2, 1974, Ser. No. 528,887
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—16



241,236
THERMOCHROMIC REFRIGERATOR TEMPERATURE INDICATOR
Philip L. Van Kersen, P.O. Box 40423, Indianapolis, Ind. 46204
Filed Jan. 10, 1975, Ser. No. 540,107
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57

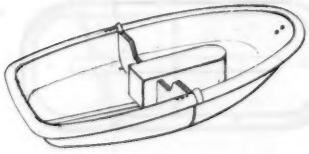


241,237
**WEIGHING AND LABELING MACHINE CONSOLE**
Charles R. Pettis, Jr., Ithaca, N.Y., assignor to High-Speed Checkweigher Co., Inc., Ithaca, N.Y.
Filed Jan. 29, 1975, Ser. No. 544,943
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—88

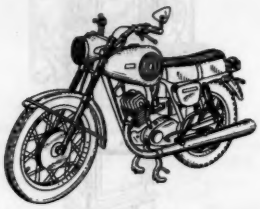


241,238
**WATCH CROWN**
Raymond J. Grohoski, Watertown, Conn., assignor to Timex Corporation, Waterbury, Conn.
Filed Oct. 16, 1974, Ser. No. 511,131
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—131

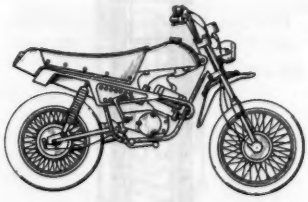
241,239
**BOAT**
Howard G. Goldsmith, Cranston, R.I., assignor to Todd Enterprises, Inc.
Filed Nov. 24, 1975, Ser. No. 634,477
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



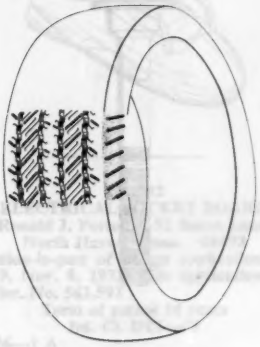
241,240
**MOTORCYCLE**
Georgy Lvovich Pisarev, Pushkinskaya ulitsa 213, kv. 6; and Vasily Ivanovich Panov, Pushkinskaya ulitsa 182, kv. 4, both of Izhevsk, U.S.S.R.; and Evgeny Andreevich Ovsenjuk, Boitsovaya ulitsa 13, korpus kv. 13; and Tatyana Arturovna Shepeleva, ulitsa Panferova 5, korpus 2, kv. 190, both of Moscow, U.S.S.R.
Filed June 1, 1973, Ser. No. 366,209
Term of patent 7 years
Int. Cl. D12—*11*
U.S. Cl. D12—110



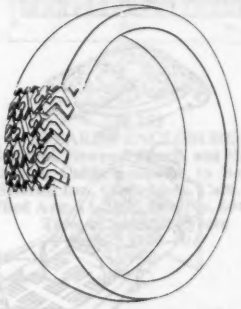
241,241
**MOTOR BIKE**
David McElroy, St. Clair Shores, Mich., assignor to Engine Specialties, Inc., Cornwell Heights, Pa.
Filed Dec. 5, 1973, Ser. No. 422,054
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—110



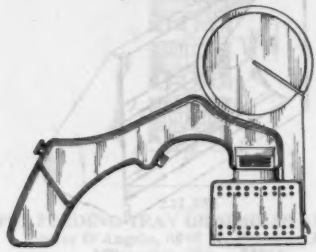
241,242
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerassimos C. Candiliotis, Agawam, Mass., assignor to Uniroyal, Inc.
Filed June 27, 1975, Ser. No. 590,891
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142



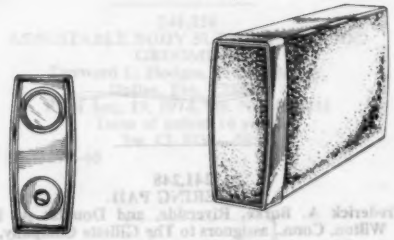
241,243
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerassimos C. Candiliotis, Agawam, Mass., assignor to Uniroyal, Inc.
Filed June 27, 1975, Ser. No. 591,000
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—151



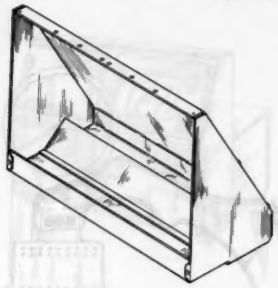
241,244
HAND HELD TAPE APPLICATOR TOOL OR SIMILAR ARTICLE
Winfield S. Archer, 41 Vine Lane, Levittown, Pa. 19054, and Joseph Trus, Yardley Commons, Yardley, Pa. 19067
Filed May 9, 1975, Ser. No. 576,165
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—69



241,245
BORE-SIGHTER FOR FIREARMS
Claus O. Huckenbeck, Sherman Oaks, Calif., assignor to Bausch & Lomb, Incorporated, Rochester, N.Y.
Filed Jan. 2, 1975, Ser. No. 538,087
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—8

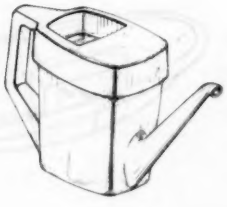


241,246
TARGET RANGE
George E. De Vogelaere, 594 Landing Road N., Rochester, N.Y. 14625
Filed Mar. 17, 1975, Ser. No. 559,325
Term of patent 14 years
Int. Cl. D22—*04*
U.S. Cl. D22—15



241,247
FISHING LURE
Larry L. Marek, 444 Benson NE., Grand Rapids, Mich. 49503
Filed July 10, 1974, Ser. No. 487,183
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

241,248
WATERING PAIL
Frederick A. Burke, Riverside, and Douglas A. Long, Wilton, Conn., assignors to The Gillette Company, Boston, Mass.
Filed Nov. 3, 1975, Ser. No. 628,219
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—11

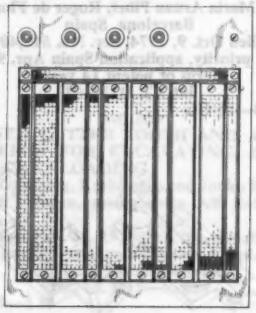


241,249
INTEGRAL RISER AND SPRINKLER HEAD
John M. Elek, 5111 Corning Ave., Los Angeles, Calif. 90056
Filed Mar. 13, 1975, Ser. No. 558,144
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—7

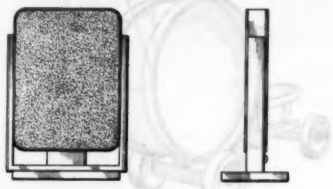
241,250
INFANT BATH AND LOUNGE SEAT
Sandra H. Fotre, 2351 Siena Court, and Donna I. Boeckman, 2326 N. Indian Hill, both of Claremont, Calif. 91711
Filed July 31, 1975, Ser. No. 600,568
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—52

241,251
**TOILET FOR CHILDREN**
Lucinda Willis, 4108 Hillcrest Drive, Los Angeles, Calif. 90008
Filed Sept. 19, 1975, Ser. No. 615,072
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—53

241,252
**ELECTRICAL SOCKET BOARD**
Ronald J. Portugal, 52 Susan Lane, North Haven, Conn. 06473
Continuation-in-part of design application Ser. No. 413,919, Nov. 8, 1973. This application Mar. 27, 1975, Ser. No. 562,593
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



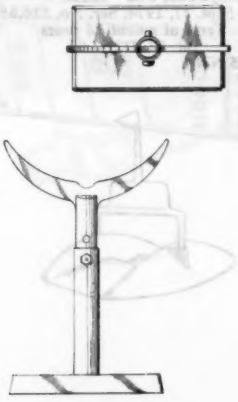
241,253
**SPEAKER ENCLOSURE**
Jose Juan Bertagni, Newport Beach, and Haskell M. Metz, Laguna Beach, Calif., assignors to Bertagni Electro-acoustic Systems Inc., Costa Mesa, Calif.
Filed Aug. 13, 1975, Ser. No. 604,448
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 G



241,254
**ROTATABLE POULTRY CAGE TIER**
Gerald L. Kitson, 9709 Belding Road, Rockford, Mich. 49341
Filed June 24, 1974, Ser. No. 482,373
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—4

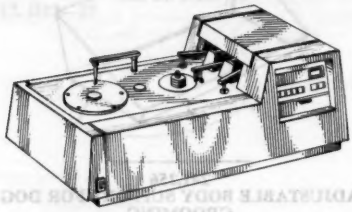
241,255
**PET FEEDING TRAY OR SIMILAR ARTICLE**
James D'Angelo, 8045 W. Potomac Ave., Milwaukee, Wis. 53218
Filed Apr. 14, 1975, Ser. No. 567,698
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—13

241,256
**ADJUSTABLE BODY SUPPORT FOR DOG GROOMING**
Durward L. Hodges, 210 N. Bagley, Dallas, Tex. 75211
Filed Aug. 19, 1974, Ser. No. 498,432
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—40



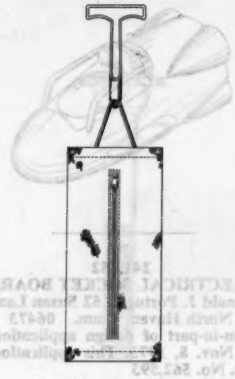
241,257
MICROTOME SHAVER TRAP
Warren Drake, 1205 Langdon Blvd., Rockville Centre, N.Y. 11570, and Jack R. Scheel, 35 Candle Lane, Levittown, N.Y. 11756
Filed Nov. 11, 1974, Ser. No. 522,510
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D32—2 C

241,258
COAGULOMETER
Thomas E. Salisbury, Highland Park, Ill., and Michael C. Guerrero and Edward I. Levy, Miami, Fla., assignors to American Hospital Supply Corporation
Filed Nov. 21, 1974, Ser. No. 525,919
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D32—2 C

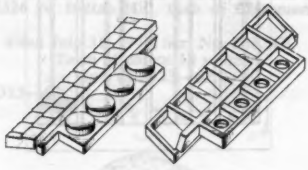


241,259
GOLF PUTTING AID
Ralph Perotta, 2640 NE. 135th St., Apt. 208, North Miami, Fla. 33161, and Anthony Corazzini, 1306 N. 28th Ave., Hollywood, Fla. 33020
Filed Sept. 27, 1974, Ser. No. 510,059
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 NN

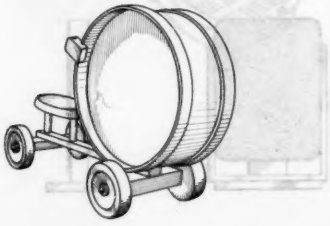
241,260
TENNIS BALL RETRIEVER
Dalny Travaglio, Kensington, Calif., assignor to Madewell Products, Inc., Oakland, Calif.
Filed Mar. 6, 1975, Ser. No. 555,738
Term of patent 3½ years
Int. Cl. D21—*01*
U.S. Cl. D34—5 ST



241,261
TOY BUILDING BLOCK
Jose Maria Arnau Pibet, Roger de Flor 86, Barcelona, Spain
Filed Oct. 9, 1974, Ser. No. 513,407
Claims priority, application Spain Apr. 9, 1974
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 GG

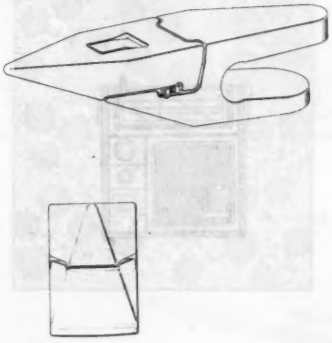


241,262
VEHICULAR TOY
Wayne Kuna, Oak Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.
Filed Apr. 9, 1975, Ser. No. 566,449
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



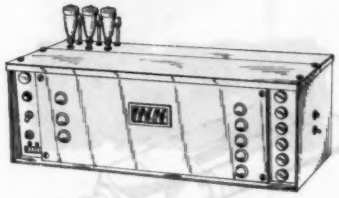
241,263
**DISTRIBUTOR FOR GRANULAR MATERIAL**
Alexander Walter Luckhurst, Brierley Hill, England, assignor to Imperial Chemical Industries Limited, London, England
Filed Jan. 18, 1974, Ser. No. 435,153
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D35—2 R

241,264
**COMBINED CUTTER TOOTH AND ADAPTER THEREFOR FOR EXCAVATING, DIGGING OR BUCKET LOADING**
Sten Johan Dahlberg, Karlskoga, and Jouko Kalevi Korpi, Degerfors, Sweden, assignors to AB Bofors, Bofors, Sweden
Filed Feb. 26, 1974, Ser. No. 446,031
Claims priority, application Sweden Sept. 4, 1973
Term of patent 14 years
Int. Cl. D15—*03, 04*
U.S. Cl. D39—1 R

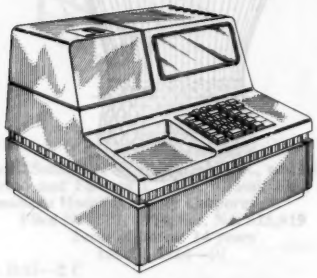


241,265
**CANDLEHOLDER**
David J. Rothbauer, Houston, Tex., assignor to Faroy, Inc., Houston, Tex.
Filed May 7, 1975, Ser. No. 575,573
Term of patent 14 years
Int. Cl. D11—*02;* D26—*01*
U.S. Cl. D48—2

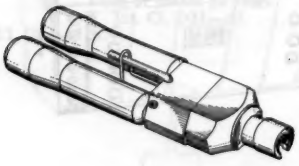
241,266
**CONTROL CONSOLE FOR AUTOMATIC WASHING MACHINE**
Roger L. Dillon, Cottage Grove, Spencer B. Larson, South St. Paul, and Marcus I. Nystuen, St. Paul, Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.
Filed Mar. 12, 1974, Ser. No. 450,358
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D49—1 R



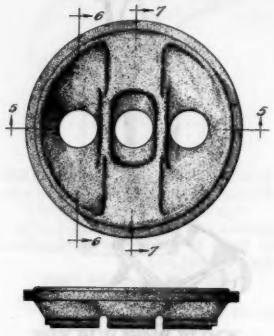
**241,267**
**ELECTRONIC CASH REGISTER OR SIMILAR ARTICLE**
**William L. King, 2274 Yorkshire Place, Dayton, Ohio 45419, and Thomas L. Hermann, 4540 Selma Pike, Springfield, Ohio 45502**
**Filed Dec. 20, 1974, Ser. No. 534,938**
**Term of patent 14 years**
**Int. Cl. D20—*02***
**U.S. Cl. D52—4 A**



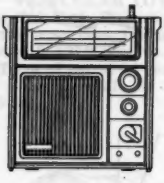
**241,268**
**HYDRAULIC TENSIONING RAM**
**Manfred E. A. Wyder, City of Industry, Calif., assignor to Swiss-Aire Instruments, Inc., City of Industry, Calif.**
**Filed June 16, 1975, Ser. No. 587,108**
**Term of patent 14 years**
**Int. Cl. D15—*99***
**U.S. Cl. D55—1 G**



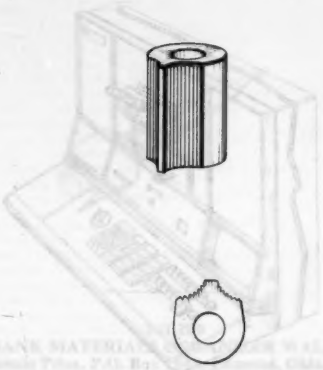
**241,269**
**ORIFICE RING USED IN GLASS FORMING MACHINERY AND THE LIKE**
**A. Daniel Fentzke, Wethersfield, Conn., assignor to Emhart Industries, Inc.**
**Filed June 25, 1975, Ser. No. 590,233**
**Term of patent 14 years**
**Int. Cl. D15—*09***
**U.S. Cl. D55—1 H**



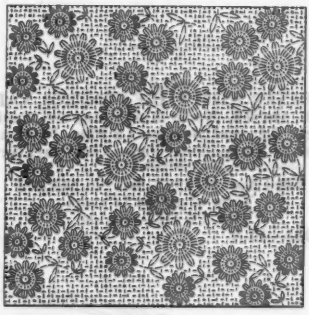

**241,270**
**RADIO**
**Kunio Takei, Hong Kong, assignor to Nissei Sangyo Co. Ltd., Minato-ku, Tokyo, Japan**
**Filed May 20, 1974, Ser. No. 471,237**
**Claims priority, application Great Britain Jan. 3, 1974**
**Term of patent 14 years**
**Int. Cl. D14—*03***
**U.S. Cl. D56—4 B**



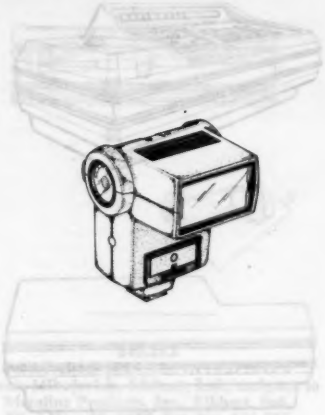
241,271
**BINOCULAR ADJUSTMENT KNOB**
Claus O. Huckenbeck, Sherman Oaks, Calif., assignor to Bausch & Lomb, Inc.
Filed Apr. 30, 1975, Ser. No. 573,579
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D57—1 E



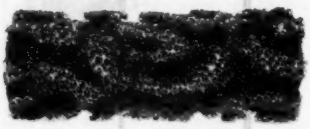
241,272
**SHEET OF PAPER TOWELING**
Ikki Matsumoto, Loveland, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed July 10, 1974, Ser. No. 487,428
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D59—2 B



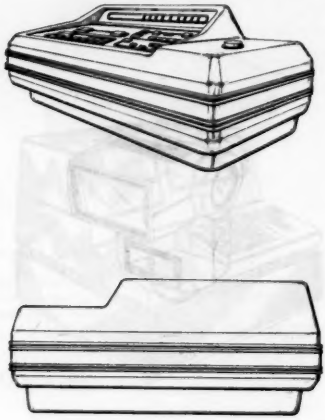
241,273
**ELECTRONIC FLASH UNIT**
Tadahide Okuno and Masahiro Karaki, Osaka, Japan, assignors to Matsushita Electric Industrial Co., Kadoma, Osaka, Japan
Filed Dec. 24, 1974, Ser. No. 536,307
Claims priority, application Japan July 3, 1974
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42



241,274
**PAINT ROLLER**
Kiyoshi Hori, Suita-shi, Osaka, Japan, assignor to Nippon Paint Co., Ltd., Osaka, Japan
Filed Mar. 31, 1975, Ser. No. 563,832
Claims priority, application Japan Sept. 30, 1974
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D64—18

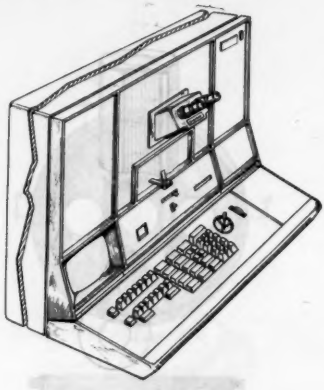


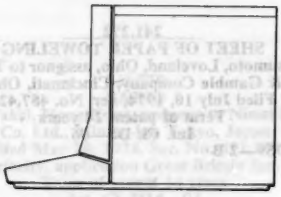
241,275
**BLOOD TESTING APPARATUS**
Raymond M. Green, Jr., Richardson, Tex., assignor to General Medical Systems, Inc.
Filed July 2, 1974, Ser. No. 485,066
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F



241,276
**ACUPUNCTURE NEEDLE**
Everett A. Crocker, 15 White Gate Road, North Billerica, Mass. 01821
Filed July 24, 1974, Ser. No. 491,568
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R

241,277
**BLOOD CELL SCANNING DEVICE CONSOLE OR SIMILAR ARTICLE**
James A. Odom, Jr., Apple Valley, and Norbert Thomas Wolfe, Minnetonka, Minn., assignors to Honeywell, Inc., Minneapolis, Minn.
Filed Mar. 5, 1975, Ser. No. 555,508
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F

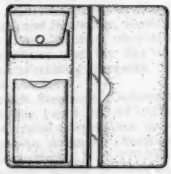




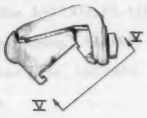
241,278
**CATHETER WITH FLOW CONTROL VALVE**
Charles B. McNeil, North Kingstown, and Paul Hanifl, Warwick, R.I., and Norman La Pine, Putnam, Conn., assignors to International Paper Company, New York, N.Y.
Filed Apr. 15, 1975, Ser. No. 568,203
Term of patent 14 years
Int. Cl. D24—*02, 04*
U.S. Cl. D83—12 A

241,279
**HAND-HELD ELECTRIC HAIR DRYER**
Martin J. Wolff, West Haven, Conn., and Dov Z. Glucksman, Brookline, Mass., assignors to Sperry Rand Corporation, Bridgeport, Conn.
Filed June 4, 1975, Ser. No. 583,616
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 F

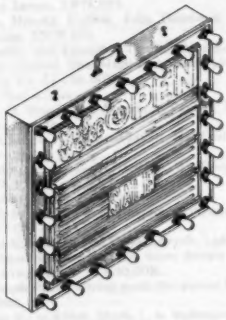
241,280
**BANK MATERIALS ORGANIZER WALLET**
J. Thomas Price, P.O. Box 1068, Edmond, Okla. 73034
Filed Mar. 3, 1975, Ser. No. 554,722
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 A



241,281
**RAZOR BLADE CARTRIDGE**
Chester F. Jacobson, Southboro, Mass., assignor to The Gillette Company, Boston, Mass.
Continuation-in-part of abandoned design application Ser. No. 443,155, Feb. 15, 1974. This application Oct. 17, 1975, Ser. No. 623,348
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A



241,282
**PORTABLE ILLUMINATED SIGN**
Steven Mihojevich, Elkhart, Ind., assignor to Metaline Products, Inc., Elkhart, Ind.
Filed Dec. 18, 1975, Ser. No. 641,976
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R



# LIST OF PATENTEES

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## PATENTS WERE ISSUED ON THE 31ST DAY OF AUGUST, 1976

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Abic Ltd.: *See—*
Haber, Raphael Ralph G.; and Simonovitch, Chaim, 3,978,072.

Aboutboul, Henri A.; Kirch, William; and Krekeler, Jerome H., to National Petro Chemicals Corporation. Catalyst useful for olefin polymerization process. 3,978,002, Cl. 252-456.000.

Acco International Inc.: *See—*
Rose, Allen J.; and Feldmahr, Walter, 3,977,527.

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Hankel, Keith M., 3,977,492.

Adahan, Carmeli: *See—*
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Adams, Stuart Sanders; Armitage, Bernard John; Bristow, Norman William; and Heathcote, Bernard Vincent, to Boots Company Limited, The. Xanthen derivatives such as N,N'-dimethyl-N-9-xanthenylurea and the like in anti-secretory compositions, and method of treating therewith. 3,978,226, Cl. 424-283.000.

Adamson, Arthur P.: *See—*
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Aerojet-General Corporation: *See—*
Katzakian, Arthur, Jr.; Weyland, Herman H.; Steele, Roger B.; and Gold, Marvin H., 3,977,996.
Katzakian, Arthur, Jr.; Weyland, Herman H.; Steele, Roger B.; and Gold, Marvin H., 3,978,026.

Aeroquip Corporation: *See—*
Swander, Kenneth D., Jr.; and Sibley, Bruce D., 3,977,308.
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Aerpat A.G.: *See—*
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AFGA-Gevaert, A.G.: *See—*
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AGA Aktiebolag: *See—*
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Simm, Walter, 3,978,492.
Wagensonner, Eduard; Winkler, Alfred; and Winkler, Friedrich, 3,977,776.

Aichinger, Horst, to Siemens Aktiengesellschaft. Regulating installation for power transmitted to a three-phase user. 3,978,339, Cl. 250-402.000.

Aida, Seizaburo. Game score reproduction device for indoor board games such as chess and go. 3,977,682, Cl. 273-136.00A.

Air Products and Chemicals, Inc.: *See—*
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Airsamplex Corporation: *See—*
Sainsbury, Cleo, 3,977,479.

Aisin Seiki Kabushiki Kaisha: *See—*
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Tsubouchi, Kaoru, 3,977,105.

Akaba, Hayao; Ikeda, Akira; Michihiro, Sho; and Lee, Masayoshi, to Kabushiki Kaisha Hoya Lens. Servo system for finishing objects materials. 3,978,386, Cl. 318-626.000.

Akatsuka, Mitsuo: *See—*
Imaizumi, Ichiro; Tomura, Teruichi; Akatsuka, Mitsuo; Katsueda, Mineo; Okada, Toshiaki; and Iyama, Hiroyuki, 3,978,369.
Tomura, Teruichi; Iyama, Hiroyuki; and Akatsuka, Mitsuo, 3,978,368.

Akebono Brake Industry Co., Ltd.: *See—*
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Akiba, Minoru. Cigarette with a snuffer. 3,977,416, Cl. 131-4.00A.

Akibayashi, Osamu: *See—*
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Akins, Robert J., Sr.: *See—*
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Akzona Incorporated: *See—*
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Albert, Albert F. Door alarm system responsive to forced entry. 3,978,467, Cl. 340-274.00R.

Alberto Culver Company: *See—*
Reever, Richard E.; and Dasher, George F., 3,977,151.

Albright, Charles Jere; Fitch, Clifford E., Sr.; and Fitch, Clifford E., Jr. Apparatus for cooking food in hot non-aqueous liquids under pressure. 3,977,434, Cl. 137-625.470.

Albright, James A., to Michigan Chemical Corporation. Pentaerythritol cyclic diphosphates and diphosphoramidates. 3,978,167, Cl. 260-927.00R.

Albright & Wilson Limited: *See—*
Coates, Harold; Hoye, Peter Albert Theodore; and Wilkins, Anthony James, 3,978,023.
Coates, Harold; Collins, John Desmond; and Siddiqui, Iftikhar Hussain, 3,978,102.

Alcock, Leslie; and Lazenby, Terence Michael, to British Petroleum Company Limited, The. Multi-bed, mixed-phase, down-flow reactor. 3,977,834, Cl. 23-288.00R.

Alderholt, Paul J.: *See—*
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Aldrich-Boranes, Inc.: *See—*
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Alewelt, Wolfgang: *See—*
Bottenbruch, Ludwig; Alewelt, Wolfgang; and Merten, Josef, 3,978,157.

Alfred Herbert Limited: *See—*
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Alig, Roger Casanova; and Onyshkevych, Lubomyr Stephen, to RCA Corporation. Surface acoustic wave device and method of making same. 3,978,436, Cl. 333-30.00R.

Allaire, Joseph Paul. Cutting guide for power handsaw. 3,977,080, Cl. 30-376.000.

Allen, Alvin E.; and Hall, Merle I., to Baltimore Aircoil Company, Inc. Process and apparatus for preparing double edge on flexible sheet material. 3,978,191, Cl. 264-285.000.

Allied Chemical Corporation: *See—*
Taub, Bernard, 3,977,989.

Allitt, Bernard Charles: *See—*
Searle, Eric Henry; and Allitt, Bernard Charles, 3,977,131.

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Juhlin, Lars-Erik, 3,978,389.
Nordstrom, Karl Tage, 3,977,694.
Spicar, Erich, 3,978,442.
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Alonso, Juan Perez, to Samsonite Corporation. Luggage case construction. 3,977,501, Cl. 190-49.000.

Alpha Engineering Corporation: *See—*
Rheinfelder, William A., 3,978,422.

Alps Electric Co., Ltd.: *See—*
Aoki, Masatsugu, 3,978,438.

Altiparmakian, Rodolf; and Bohler, Hans, to Sandoz Ltd. Acridone compounds. 3,978,062, Cl. 260-276.000.

Altshuler, Saul: *See—*
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Aluminum Company of America: *See—*
Couchman, Richard, 3,977,225.
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Tortil, Pierre, 3,977,950.

Alvi, Zea Raheem; Bradley, William David; Denham, Keith; and Summerlin, Frederick Arthur, to Aerpat A.G. Anvil for blind riveting tool. 3,977,229, Cl. 72-391.000.

Alway, Peter: *See—*
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Alza Corporation: *See—*
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AMA Universal S.p.A.: *See—*
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Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, to Matsushita Electric Industrial Co., Ltd. Induction heating apparatus with protective circuit arrangement. 3,978,307, Cl. 219-10.770.

American Can Company: *See—*
Dobbins, Thomas Edward; Hanson, William Duane; and Wenzel, Ronald Eugene, 3,978,260.
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Bollyky, Laszlo Joseph; and Weitman, Robert Henry, 3,978,079.
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Amlie, Thomas S. Encoding altimeter. 3,977,250, Cl. 73-386.000.

Amos, Homer C.; Callis, Samuel R.; and Scott, Charles R., to Brunswick Corporation. Machine and method for making camouflage nets. 3,977,927, Cl. 156-61.000.

AMP Incorporated: *See—*
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Anderson, Lyle V. Fry kettle with integral continuous filter. 3,977,973, Cl. 210-167.000.

Anderson, Paul L.; Houlihan, William J.; and Manning, Robert E., to Sandoz, Inc. Substituted amino-hydrazinopyridazines. 3,978,057, Cl. 260-250.00A.

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Anderson, Victor F., to Shell Oil Company. Aerosol safety cap secured by a grooved ring. 3,977,572, Cl. 222-182.000.

Andrews, Harry N.: *See—*
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Angwin, James H.; and Flannery, John B., to Pierson, Merlin A. Anticollision vehicular radar system. 3,978,481, Cl. 343-7.0VM.

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Aoki Ltd.: *See—*
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B. F. Goodrich Company, The: *See—*
Glasenapp, William A.; and Miller, Michael G., 3,977,727.
Parker, Richard Ghrist; and Kelley, Philip Carlos, 3,978,156.

Babcock-Hitachi K.K.: *See—*
Matsuda, Shimpei; Nakajima, Fumito; Takeuchi, Masato; Uno, Shigeo; Kato, Akira; Imanari, Makoto; and Watanabe, Yoshihisa, 3,977,836.

Bacha, John D.; Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for converting styrene bottoms to nitrobenzoic acids. 3,978,117, Cl. 260-523.00R.

Bachmann, Peter, to Ebauches Bettlach S.A. Display mechanism for timepieces. 3,977,179, Cl. 58-128.000.

Bacso, Imre, to Sandoz, Inc. 17β-substituted-allene-bearing steroids. 3,978,048, Cl. 260-239.55R.

Badicke, Gerd; Dell, Hans-Dieter; and Pitzken, Albrecht, to Troponwerke Dinklage & Company. Novel phenolate, a process for its preparation and its use in pharmaceutical compositions. 3,978,220, Cl. 424-267.000.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, 3,978,160.

Badone, Louis; Baulch, Frederick W. A.; Bridges, William J.; Fulton, Robert J.; Marr, Jeremy N.; Mechem, Ralph H.; Valler, Joseph W.; and Wellington, George G., to Chrysler Corporation. Apparatus for controlling the pour rate of a ladle. 3,977,460, Cl. 164-155.000.

Bagby, John P.; Ferrari, Leonard A.; Figge, Erwin E.; and Hapke, Kenyon A., to Polaroid Corporation. Film drive mode change actuator. 3,977,623, Cl. 242-191.000.

Bagnulo, Luigi, to Caunned Aktiengesellschaft. Corrosion-prevention system. 3,977,956, Cl. 204-196.000.

Baile, Clifton A.; Kingsbury, William D.; and Parish, Roger C., to SmithKline Corporation. Methods for improving the feed intake of meat producing animals. 3,978,221, Cl. 424-267.000.

Bailey, David Zabriskie. System for utilizing energy in a fluid current. 3,978,345, Cl. 290-54.000.

Bajars, Laimonis, to Catalysis Research Corporation. Process for reduction of sulfur dioxide to sulfur. 3,978,200, Cl. 423-570.000.

Baker, Archibald John Stephen, to Exxon Research and Engineering Company. Engines and compressors. 3,977,303, Cl. 91-493.000.

Baker, Don R.: *See—*
DeBaun, Jack R.; Pallos, Ferenc M.; and Baker, Don R., 3,978,227.

Bakker, Martinus Antonius Maria; and van der Hoorn, Gustaaf Herman Antonius, to U.S. Philips Corporation. Switching element having gold-cobalt contacts. 3,978,302, Cl. 200-266.000.

Bakonyi, Maria: *See—*
Szoke, Sandor; Lugosi, Gyorgy; Csermely, Gyorgy; Bakonyi, Maria; Zsolnai, Tibor; and Szepessy, Istvan, 3,978,217.

Balcke-Durr Aktiengesellschaft: *See—*
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Balde, Daniel: *See—*
Nagy, Georges; Balde, Daniel; Sobel, Lucien; and Parvi, Ludovic, 3,978,169.

Baldwin, John J.; and Novello, Frederick C., to Merck & Co., Inc. 1,3,-5-Trisubstituted-1,2,4-triazole compounds. 3,978,054, Cl. 260-247.50E.

Baldyga, Joseph W.; and Cairns, Thomas M., to Diamond Die & Mold Co. Conveyor feed mechanism. 3,977,587, Cl. 226-74.000.

Ball Corporation: *See—*
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Balmasova, Irina Petrovna: *See—*
Buchin, Petr Ivanovich; Lipkin, Adolf Evgenievich; Rudzit, Ernest Alexandrovich; Zenin, Boris Alexeevich; Viderker, Maxim Georgievich; Smirnov, Viktor Alexandrovich; Balmasova, Irina Petrovna; Orlov, Evgeny Vladimirovich; and Chichkova, Larisa Alexandrovna, 3,978,082.

Baltimore Aircoil Company, Inc.: *See—*
Allen, Alvin E.; and Hall, Merle I., 3,978,191.

Bankes, Frederick M., to Lawrence Peska Associates, Inc., a part interest. Safety transmitting device. 3,978,447, Cl. 340-33.000.

Barabas, Eugene S.; and Fein, Marvin M., to GAF Corporation. Graft copolymers of a poly (N-vinyl lactam) containing/unsaturated ethylenic/ and dibasic carboxylic acid monoester sidechains and stable emulsions of such graft copolymers. 3,978,163, Cl. 260-885.000.

Barbe, Jacques: *See—*
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Barber-Colman Company: *See—*
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Barber, William H.: *See—*
Beckert, Werner F.; Barber, William H.; Dengel, Ottmar H.; and Robb, Robert A., 3,977,990.

Barna, Bohdan, to Chemo Drug Company. Electrolyte solutions containing magnesium and free bicarbonate ions. 3,978,212, Cl. 424-156.000.

Barnes, Edgar E.: *See—*
Owens, Malcolm P.; and Barnes, Edgar E., 3,977,615.
Owens, Malcolm P.; and Barnes, Edgar E., 3,977,616.

Barnett, Morris A.: *See—*
United States of America, National Aeronautics and Space Administration; and Barnett, Morris A., 3,978,490.

Barron, Donald Robert, to EMI Limited. Tracking and/or guidance systems. 3,977,628, Cl. 244-3.160.

Barrow, Kevin David; and Mellows, Graham, to Beecham Group Limited. Antibiotics. 3,977,943, Cl. 195-96.000.

Barton, Robert Stanley; Davis, Alan Lynn; Hauck, Erwin Arthur; Lyle, Don Martin; and Turner, Lloyd Drayton, to Burroughs Corporation. System and method for concurrent and pipeline processing employing a data driven network. 3,978,452, Cl. 340-172.500.

Barton, Steve; Glorioso, John; and Foltz, Carl L., to Concept, Inc. Variable temperature electric cautery assembly. 3,978,312, Cl. 219-240.000.

Basek, Karel: *See—*
Zahradnik, Stanislav; Svoboda, Hubert; Basek, Karel; Ruta, Vladislav; and Koza, Frantisek, 3,977,443.

BASF Aktiengesellschaft: *See—*
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Eilingsfeld, Heinz; and Patsch, Manfred, 3,978,144.
Fuchs, Werner; Platz, Rolf; and Vogt, Volker, 3,978,105.
Gaiser, Dieter; Loewenberg, Gustav; Fitterer, Horst; and Woweries, Uwe, 3,977,626.
Habermann, Wolfgang; Bruck, Wolfgang; and Simmler, Werner, 3,977,959.
Schick, Hans; Mueller-Tamm, Heinz; and Hennenberger, Peter, 3,977,997.

BASF Farben & Fasern Aktiengesellschaft: *See—*
Berger, Rolf; Kuch, Wolfgang; and Endriss, Hartmut, 3,977,895.

Baston, Irv; Lowery, J. Orbie; and Thomas, O. Leon, to Southwire Company. Insulated wire stripper. 3,977,277, Cl. 81-9.510.

Bates, Charles. Controlled pressure drop valve. 3,977,435, Cl. 137-625.300.

Battault, Andre, to Ceraver. Bone prosthesis made of sintered alumina. 3,977,026, Cl. 3-1.910.

Battista, Carmine A.: *See—*
Maruhnic, Peter; Wolk, Ronald Howard; and Battista, Carmine A., 3,978,199.

Bauer, Gordon L. Traverse mechanism. 3,977,258, Cl. 74-25.000.

Baugh, Charles Richmond; and Wooley, Bruce Allen, to Bell Telephone Laboratories, Incorporated. One-bit full adder. 3,978,329, Cl. 235-176.000.

Baulch, Frederick W. A.: *See—*
Badone, Louis; Baulch, Frederick W. A.; Bridges, William J.; Fulton, Robert J.; Marr, Jeremy N.; Mechem, Ralph H.; Valler, Joseph W.; and Wellington, George G., 3,977,460.

Baumberger, Philippe, to Compagnie Generale d'Automatisme. Device for recognizing a category of coins. 3,977,508, Cl. 194-100.00A.

Bausch & Lomb Incorporated: *See—*
Kadlecik, John; Manning, Wayne R.; and Williams, John R., III, 3,977,517.

Baxter Laboratories, Inc.: *See—*
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Bayer Aktiengesellschaft: *See—*
Aya, Masahiro; Kudamatsu, Akio; Miyamoto, Masao; Fukazawa, Nobuo; and Osuga, Shigeki, 3,978,107.
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Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, 3,978,069.
Dickore, Karlfried; Draber, Wilfried; Timmler, Helmut; Eue, Ludwig; and Schmidt, Robert R., 3,978,068.
Enders, Edgar; and Frohberger, Paul-Ernst, 3,978,222.
Gottschlich, Alois; Leverenz, Klaus; and Moritz, Karl-Ludwig, 3,978,040.
Konig, Hans-Bodo; Schrock, Wilfried; and Metzger, Karl-Georg, 3,978,056.
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Moller, Eike; Meng, Karl; Wchinger, Egbert; and Horstmann, Harald, 3,978,077.
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Naumann, Gunther; Pieper, Gustav; and Rehberg, Hans-Joachim, 3,978,206.
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Pawellek, Dieter; Bielendorfer, Edmund; and Wedemeyer, Karlfried, 3,978,131.
Sommer, Richard; and Wolfrum, Gerhard, 3,978,039.
Sundermann, Rudolf; Putter, Rolf; and Grigat, Ernst, 3,978,028.

Bayless, John R., to Hughes Aircraft Company. High-voltage mechanical support for gas discharge device. 3,978,363, Cl. 313-289.000.

Beale, Charles, to General Motors Corporation. Fabric cutting blade. 3,977,287, Cl. 83-697.000.

Bearzi, Vittorio, to Sunlife S.p.A. System for recovering solar energy and its direct utilization. 3,977,601, Cl. 237-1.00A.

Beatrice Foods Co.: *See—*
Lovejoy, Walter R., 3,977,821.
Lovejoy, Walter R., 3,978,186.

Beatty, Theodore R.; and Vourlis, Harry, to Union Carbide Corporation. Flat alkaline cell with positive and negative terminal connections and a third terminal connection for an auxiliary electrode. 3,977,906, Cl. 136-111.000.

Becker, Burkhardt, to Volkswagenwerk Aktiengesellschaft. Steering wheel. 3,977,271, Cl. 74-552.000.

Becker, Carl; Wegmann, Jacques; and Schaub, Andres, to Ciba-Geigy AG. Aqueous dyestuff preparations of dyestuffs insoluble to difficultly soluble in water. 3,977,828, Cl. 8-79.000.

Beckert, Werner F.; Barber, William H.; Dengel, Ottmar H.; and Robb, Robert A., to United States of America, Navy. Controlled generation of cool hydrogen from solid mixtures. 3,977,990, Cl. 252-188.30R.

Becton, Dickinson and Company: *See—*
Kavanagh, Lawrence Grote; and Hopkins, Brian Martin, 3,978,280.

Beecham Group Limited: *See—*
Barrow, Kevin David; and Mellows, Graham, 3,977,943.
Buckle, Derek Richard; and Smith, Harry, 3,978,231.
Vere-Hodge, Richard Anthony, 3,978,043.

Beffa, Fabio; and Fasciati, Alfred, to Ciba-Geigy Corporation. Azo, azo methine 1:2 chromium complex dyes. 3,978,037, Cl. 260-151.000.

Bell Telephone Laboratories, Incorporated: *See—*
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Bergeron, Robert Francis, Jr.; and Southworth, Hamilton, Jr., 3,978,291.

Evans, William Joshua; Grant, Wesley Norman; and Murphy, Bernard Thomas. 3,978,515.
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Kasper, Horst Manfred; Migliorato, Piero; Shay, Joseph Leo; and Wagner, Sigurd. 3,978,510.
Leifer, Noel Arthur; and Raymore, Jack Drake. 3,977,624.
Limiero, Albert David; and Lipien, Edwin Walter. 3,978,294.
Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory. 3,978,426.
Moran, John Christian. 3,978,456.
Nevis, Benjamin Edward; and Tisone, Thomas Charles. 3,977,955.

Bench, Stephen Michael, to B-Cubed Engineering, Inc. Dynamic expander. 3,978,423, Cl. 330-141.000.

Bender, Allan D.; Berkoff, Charles E.; and Groves, William G., to SmithKline Corporation. Heterocyclic homoprostanoidal derivatives. 3,978,225, Cl. 424-276.000.

Bendix Corporation, The: *See—*
Ditlinger, Richard J., 3,977,274.
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Gardner, Delbert J., 3,977,299.
Johannesen, Donald D., 3,977,499.

Benedetti, Edward R., to USM Corporation. Molding clips. 3,977,048, Cl. 24-73.0FT.

Bengtsson, Bengt Lennart: *See—*
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Berg, James W.: *See—*
Tigner, Reuben A.; and Berg, James W., 3,978,378.

Berg, Ragnvy. Sinker for bait casting and fly-fishing. 3,977,116, Cl. 43-43.120.

Berger, Rolf; Kuch, Wolfgang; and Endriss, Hartmut, to BASF Farben & Fasern Aktiengesellschaft. Method of reducing the amount of cadmium capable of being extracted from calcined cadmium pigment powder by human gastric juices. 3,977,895, Cl. 106-301.000.

Berger, Volker Ernst Uwe, to Orschler Produktion KG. Rack having supporting tubes connected by means of releasable couplings. 3,977,528, Cl. 211-182.000.

Bergeron, Robert Francis, Jr.; and Southworth, Hamilton, Jr., to Bell Telephone Laboratories, Incorporated. Automated main distributing frame system. 3,978,291, Cl. 179-16.00R.

Berggren, David: *See—*
Etherington, Geoffrey; and Berggren, David, 3,977,654.

Berggren, Jarl Erik: *See—*
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Berggren, Karl-Erik, to A-Kyl i Farsta AB. Switching device. 3,977,650, Cl. 251-129.000.

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Berkoff, Charles E.: *See—*
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Bernhard, Frank. Method of burning residual fuel oil in distillate fuel oil burners. 3,977,823, Cl. 431-11.000.

Berns, Heinz-Josef: *See—*
Ohorodnik, Alexander; Dettmeier, Udo; Gehrmann, Klaus; and Berns, Heinz-Josef, 3,978,146.

Berry, Clyde F. Multiple boiler steam generation system. 3,977,198, Cl. 60-676.000.

Berry, Thomas L., Jr.; and Mock, Kyle E., to Litho-Paint Poster Company. Freezer rail talker. 3,977,109, Cl. 40-124.100.

Bertelli, Aldo, to Rorer Italiana S.p.A. Bis-2,6-[N-(α-benzoylthiopropionyl)glycyloxymethyl]pyridine. 3,978,070, Cl. 260-294.80G.

Bertrand, Olivier, to Societe Generale des Ciments Portland de l'Escaut. Road-surfacing compositions containing filler materials. 3,977,891, Cl. 106-281.00R.

Bethel, Everett L.: *See—*
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Bettcher Industries, Inc.: *See—*
Bettcher, Louis A., 3,977,315.

Bettcher, Louis A., to Bettcher Industries, Inc. Food press and dies. 3,977,315, Cl. 100-232.000.

Betz, Erwin C. Wood fly ash reduction method. 3,978,197, Cl. 423-332.000.

Betz Laboratories, Inc.: *See—*
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Beyerlein, Ludwig; Geibel, Jurgen; Lachner, Otto; and Langer, Manfred, to Lever Brothers Company. Injection moulding manifold. 3,977,820, Cl. 425-247.000.

Bianchi, John E.; and Nichols, Richard D. E., to Bianchi Leather Products, Inc. Front opening holster. 3,977,583, Cl. 224-2.00B.

Bianchi Leather Products, Inc.: *See—*
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Bielendorfer, Edmund: *See—*
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Bienfait, Charles: *See—*
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Bieri, Karl, to Hagezet-Aktiengesellschaft. Brewing container for a beverage brewing machine. 3,977,313, Cl. 99-297.000.

Bigelow, John Howard, to Du Pont de Nemours, E. I., and Company. Photographic element with contiguous layer containing an oxidizing agent. 3,977,879, Cl. 96-95.000.

Bioimplant S.a.s. di Fiorino Pagani & C.: *See—*
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Bird Machine Company, Inc.: *See—*
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Birnbaum, Jerome: *See—*
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Bischoff, Robert F., Jr. Process for developing surfaces. 3,977,803, Cl. 404-72.000.

Bison-werke Bahre & Greten GmbH & Co. KG: *See—*
Greten, Berndt, 3,978,250.

Bitko, Sheldon S., to Fifth Dimension Inc. Mercury tilt switch. 3,978,301, Cl. 200-220.000.

Bittner, Robert B. Method and apparatus for preventing buckling of pipeline as it is being assembled and laid on the ocean floor. 3,977,201, Cl. 61-112.000.

Black, Robert G. Air tool lubricator. 3,977,496, Cl. 184-55.00A.

Blake, David E.: *See—*
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Blake, William R., to Aquarius, Inc. Wall indexing machine. 3,977,534, Cl. 214-1.00H.

Bloch, Heinz P.; and Colwell, Charles J., to Exxon Research and Engineering Company. Method and apparatus for reclaiming contaminated liquid. 3,977,972, Cl. 210-63.00R.

Block, Thomas S., to Clarke-Gravely Corporation. Air blast sweeper with dust control system. 3,977,039, Cl. 15-346.000.

Blue M Electric Company: *See—*
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Blum, Alfred, to Borden, Inc. Adhesive tape having printable release coating. 3,978,274, Cl. 428-476.000.

Blum Gesellschaft m.b.H.: *See—*
Rock, Erich; and Mages, Bernhard, 3,977,041.

Bober, Robert E.; and Lavallee, Robert G., to American Optical Corporation. Apparatus and method for taking the derivative of a slowly varying electrical signal. 3,978,414, Cl. 328-132.000.

Bochan, John, to General Electric Company. Lint filter for automatic washer. 3,977,219, Cl. 68-18.00F.

Bodenseewerk Perkin-Elmer & Co. GmbH: *See—*
Henninger, Heinz W.; Kiefer, Hans W.; Riethmuller, Lothar H.; and Spreitzhofer, Ernst Gunther Robert, 3,978,348.

Boegli, Paul. Emergency reserve water and foam generating system. 3,977,474, Cl. 169-9.000.

Boehringer Mannheim G.m.b.H.: *See—*
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Boeing Company, The: *See—*
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Boersma, Richard F., to Fiat-Allis Construction Machinery, Inc. Hydraulic control system for elevating scraper. 3,977,100, Cl. 37-8.000.

Bogaert, Pierre Emmanuel Eugene Jean. Vent closure arrangement. 3,977,134, Cl. 52-1.000.

Bogdanovic, Borislav: *See—*
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Bohler, Hans: *See—*
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Boileau, Jacques, to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie. Cable for reinforcing objects formed of elastic or easily deformable materials. 3,977,174, Cl. 57-145.000.

Bokros, Jack C.; and Akins, Robert J., Sr., to General Atomic Company. Process for depositing pyrolytic carbon coatings. 3,977,896, Cl. 427-213.000.

Bollyky, Laszlo Joseph; and Weitman, Robert Henry, to American Cyanamid Company. Chemiluminescence. 3,978,079, Cl. 260-326.00N.

Bologna, Vincent P.; and McEvoy, Joseph E., to Pitney-Bowes, Inc. Dual purpose sheet material feeding and safety apparatus. 3,977,668, Cl. 271-126.000.

Bolt, Alex W. Liquid warmer. 3,978,233, Cl. 426-115.000.

Bombola, Frank, to E/M Lubricants, Inc. Glass manufacturing composition. 3,977,885, Cl. 106-38.270.

Bonas Brothers Limited: *See—*
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Bond, Leland R.; Hymer, John W.; and Moore, Robert F., to Moore, Robert F.; and Moore, William B. Intercom call signaling mechanism. 3,978,468, Cl. 340-310.00A.

Bondi, Herman H. Vertical positioning device. 3,977,088, Cl. 33-334.000.

Bonham, Albert W. Automated hair implantation system. 3,977,335, Cl. 112-79.00R.

Boninchi S.A.: *See—*
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Bonitz, Franz, to Gruber & Kaja. Casting a shaped aluminum part on a work piece. 3,977,459, Cl. 164-98.000.

Bonnaval, Pierre, to Telecommunications Radioelectriques et Telephoniques T.R.T. Directional slot antenna for very high frequencies. 3,978,485, Cl. 343-767.000.

Booth, Richard L., to S. G. Taylor Chain Company, Inc. Automatic chain manufacturing system. 3,977,180, Cl. 59-16.000.

Boots Company Limited, The: *See—*
Adams, Stuart Sanders; Armitage, Bernard John; Bristow, Norman William; and Heathcote, Bernard Vincent, 3,978,226.

Boots, Vernie A., to A. Duda & Sons. Automatic celery sizer and sorter. 3,977,524, Cl. 209-74.00M.

Bordat, Andre Jules Edmond; and Pouillot, Michel Auguste Achille, to Societe Nationale Industrielle Aerospatiale. Adjustable hydrodynamic section for submerged foils. 3,977,348, Cl. 114-66.50H.

Borden, Inc.: *See—*
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Borenstein, David E.; and Newton, Richard C., to Phillips Petroleum Company. Method and apparatus for controlling yarn plug length. 3,977,058, Cl. 28-1.700.

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Struttmann, Hilarius S., 3,977,740.
Tuzson, John J.; and Hallberg, Irving H., 3,977,382.

Boruschewitz, Manfred; and Kulle, Klaus, to Robert Bosch G.m.b.H. Method and apparatus for simultaneously modulating with picture, sound and color signals the incidence of a recording light beam on a moving record medium. 3,978,279, Cl. 178-6.6DD.

Bosund, Sven Ingmar Walton; and Bengtsson, Bengt Lennart, to Societe d'Assistance Technique pour Produits Nestle S.A. Protein composition. 3,978,234, Cl. 426-285.000.

Bottaro, Franco, to Italsider S.p.A. Composite air-knife. 3,977,359, Cl. 118-63.000.

Bottenbruch, Ludwig; Alewelt, Wolfgang; and Merten, Josef, to Bayer Aktiengesellschaft. Thermoplastic compositions comprising aromatic polycarbonate urethanes. 3,978,157, Cl. 260-859.00R.

Botting, Donald P. Method and apparatus for storing and releasing a marine anchor line and anchor. 3,977,448, Cl. 114-210.000.

Bottomley, Herbert Geoffrey, to Landis Lund Limited. Grinding machine. 3,977,129, Cl. 51-105.00R.

Bouchaudon, Jean; Le Roy, Pierre; and Messer, Mayer Naoum, to Rhone-Poulenc S.A. Process for the preparation of ampicillin. 3,978,078, Cl. 260-306.70C.

Bourgery, Guy R.: *See—*
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Bourne, Joseph R., to Carrier Corporation. Alcohol circulation system. 3,977,204, Cl. 62-85.000.

Bourne, Joseph R., to Carrier Corporation. Alcohol separator. 3,977,211, Cl. 62-476.000.

Bouwhuis, Gijsbertus; Franken, Adrianus Jacobus Jozef; and Simons, Carel Arthur Jan, to U.S. Philips Corporation. Videodisc reader with concave mirror elements. 3,978,278, Cl. 178-6.60R.

Bowman, Kenneth Albert; Breddy, Royston Gilbert; and West, Royston John, to Strachan & Henshaw Limited. Continuous bookmaking system. 3,977,665, Cl. 270-4.000.

Boye, Frederick C.: *See—*
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Brachet, Roland Francis Charles. Process for recording and reproducing images. 3,978,500, Cl. 354-123.000.

Bradley, William David: *See—*
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Brand, Heinz: *See—*
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Brantley, Lott W., Jr., to United States of America, National Aeronautics and Space Administration. Thermal energy storage system. 3,977,197, Cl. 60-659.000.

Brasser, Pieter: *See—*
van Beem, Eric J.; and Brasser, Pieter, 3,978,014.

Brattstrom, Edward Henry: *See—*
Winyard, Frank Leslie; Graham, James; and Brattstrom, Edward Henry, 3,977,260.

Braudy, Robert Stewart; and Roberts, Hamilton Harvey, Jr., to RCA Corporation. Transfer recording process. 3,978,247, Cl. 427-43.000.

Braun, Oskar. Sealing slide for containers. 3,977,564, Cl. 220-346.000.

Brawn, Peter Nelson. Combination inhalation and exhalation respiratory therapy device. 3,977,395, Cl. 128-2.080.

Brawn, Peter Nelson. Positive pressure and volume measure respiratory device. 3,977,399, Cl. 128-2.080.

Brazhnikov, Nikolai Ivanovich: *See—*
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Breddy, Royston Gilbert: *See—*
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Breedveld, Jacobus Christiaan, to N. V. Vulcaansoord IJzergieterij en Emailleerfabrieken. Heating apparatus. 3,977,388, Cl. 126-110.00R.

Breer, Carl, II. Display device. 3,977,112, Cl. 40-152.000.

Brendling, Lennart Ingvar. Tube valve. 3,977,409, Cl. 128-349.00R.

Breuer, Hermann: *See—*
Treuner, Uwe D.; and Breuer, Hermann, 3,978,050.

Brewer, Jack J., to Sam P. Wallace Company, Inc. Stiff-leg crane. 3,977,531, Cl. 212-59.00R.

Brewer, James Edward; and Roesner, Raymond Earl, to Dresser Industries, Inc. Well bore caliper and centralizer apparatus having articulated linkage. 3,977,468, Cl. 166-241.000.

Bridges, William J.: *See—*
Badone, Louis; Baulch, Frederick W. A.; Bridges, William J.; Fulton, Robert J.; Marr, Jeremy N.; Mechem, Ralph H.; Valler, Joseph W.; and Wellington, George G., 3,977,460.

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Yukuta, Toshio; Moki, Takao; Ohashi, Takashi; Iwami, Kouichi; and Suzuki, Akira, 3,978,154.

Bright, D. Bruce; and Alderholt, Paul J., to Shell Oil Company. Aqueous windshield cleaner formulation comprising amine salts, methanol and boric acid. 3,978,010, Cl. 252-525.000.

Bristow, Norman William: *See—*
Adams, Stuart Sanders; Armitage, Bernard John; Bristow, Norman William; and Heathcote, Bernard Vincent, 3,978,226.

British Petroleum Company Limited, The: *See—*
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Topham, William Henry, 3,977,235.

British Secretary of State for Defence: *See—*
Paige, Edward George Sydney, 3,978,437.

British Steel Corporation: *See—*
Phillips, John, 3,977,333.

Britt, Robert Gordon. Atomic expansion reflex optics power optics power source (AEROPS) engine. 3,977,191, Cl. 60-509.000.

Broderick, James L.; and Fowler, William R., to National Semiconductor Corporation. Optically coupled isolator circuit having increased common mode rejection. 3,978,343, Cl. 250-551.000.

Brooke, Edric R., to Xerox Corporation. Electrostatographic transfer with air. 3,977,779, Cl. 355-3.00R.

Broussard, Douglas E.; Scott, Paul R.; and Kruka, Vitold R., to Shell Oil Company. Conservation of water for core flow. 3,977,469, Cl. 166-266.000.

Broutros, Kamal Shawiky, to Bunker Ramo Corporation. Zero insertion force connector. 3,977,747, Cl. 339-74.00R.

Brouwer, Harm Jan, to U.S. Philips Corporation. Apparatus for sampling for use in a continuous determination of a component in a gas mixture. 3,977,254, Cl. 73-422.00R.

Brown, Boveri & Company Limited: *See—*
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Brown, Dennis N. Method and apparatus for form fitting shoes and boots. 3,977,034, Cl. 12-142.00R.

Brown, Gene Edgar; and Greeson, Richard Leslie, to Motorola, Inc. Titanium-silver-palladium metallization system and process therefor. 3,978,517, Cl. 357-71.000.

Brown, Horace D. Force measuring resonator. 3,977,242, Cl. 73-141.00R.

Brown, Kenneth Raymond; Lane, Rodney; and Luff, Douglas Reginald, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Detonators. 3,977,328, Cl. 102-70.2GA.

Brown, Lester; and Moskowitz, Paul M., to Salton, Inc. Grinding apparatuses. 3,977,612, Cl. 241-254.000.

Brown, Tom C.: *See—*
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Brown & Williamson Tobacco Corporation: *See—*
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Brownlee, Robert R.: *See—*
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Bruck, Wolfgang: *See—*
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Bruckner, Markus; Guanella, Gustav; and Vouga, Claude Andre, to Patelhold Patentverwertungs- und Elektro-Holding AG. Method and apparatus for the secret transmission of speech signals. 3,978,288, Cl. 179-1.50R.

Bruguier, Jacques, to Societe Anonyme dite: Frimair S.A. Heat exchanger applicable more particularly to compressor heat pumps. 3,977,210, Cl. 62-324.000.

Bruk, Alexandr Semenovich: *See—*
Kraizinger, Fedor Vladimirovich; Zinsky, Alexei Ilich; Getman, Boris Fedorovich; Bruk, Alexandr Semenovich; Eremenko, Sergei Sergeevich; Maiorov, Alexei Ivanovich; and Reshetov, Vladimir Ivanovich, 3,977,659.

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Brumfield, Benjamin R.; and Julien, Clayton J., to United States of America, Army. Controlled fragmentation warhead. 3,977,327, Cl. 102-67.000.

Brummans, Wilhelmus Johannes, to AMP Incorporated. Electrical connector. 3,977,754, Cl. 339-99.00R.

Bruninga, Kenneth J., to L. R. Nelson Corporation. Apparatus and method for removing a sprinkler head from a pop-up sprinkler casing. 3,977,063, Cl. 29-157.00C.

Bruno, Marshall J.: *See—*
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Brunswick Corporation: *See—*
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Domaingue, George Hector, Jr., 3,977,069.
Schildbach, August J., 3,977,070.
Bryant, Raymond S. Tower having raising and lowering means. 3,977,139, Cl. 52-116.000.
Buathier, Bernard; Combes, Andre; and Jourdan, Jean-Paul, to Rhone-Poulenc Industries. Method for producing carbon disulfide. 3,978,198, Cl. 423-443.000.
Bucciconc, Velio S., to Bucciconi Engineering Co., Inc. Sheet piling method and apparatus. 3,977,537, Cl. 214-6.0DS.
Bucciconi Engineering Co., Inc.: *See—*
Bucciconc, Velio S., 3,977,537.
Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, to Bayer Aktiengesellschaft. Phenyl-imidazolyl-fatty acid derivatives. 3,978,069, Cl. 260-293.700.
Buchi, George, to Hoffmann-La Roche Inc. Synthesis of hydroxycyclopenten-1-ones. 3,978,093, Cl. 260-348.00R.
Buchin, Petr Ivanovich; Lipkin, Adolf Evgenievich; Rudzit, Ernest Alexandrovich; Zenin, Boris Alexeevich; Viderker, Maxim Georgievich; Smirnov, Viktor Alexandrovich; Balmasova, Irina Petrovna; Orlov, Evgeny Vladimirovich; and Chichkova, Larisa Alexandrovna. Derivatives of dinitro-2,2'-bithiophene and application thereof. 3,978,082, Cl. 260-329.0HS.
Buck, James R., to Buck Tool Company. Self-ejecting chuck key for gear chuck. 3,977,686, Cl. 279-1.00K.
Buck Tool Company: *See—*
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Buckle, Derek Richard; and Smith, Harry, to Beecham Group Limited. Pharmaceutical compositions and method of treating allergic conditions utilizing 2-nitroindanc-1,3-dione derivatives as the active agents. 3,978,231, Cl. 424-331.000.
Bud, Hans; and Alway, Peter, to Bud, Hans. Counting devices. 3,977,599, Cl. 235-144.0HC.
Budrys, Ignas; and Right, Robert W., to General Signal Corporation. Energy transfer circuit. 3,978,392, Cl. 323-16.000.
Bugaut, Andree: *See—*
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Kalopissis, Gregoire; Bugaut, Andree; and Zorayan, Vahan, 3,978,061.
Bullock, Alan R. Atomizing system and atomizing nozzle assembly. 3,977,608, Cl. 239-410.000.
Bullock, Robert L., to Standard Car Truck Company. Variably damped truck. 3,977,332, Cl. 105-197.0DB.
Bumueller, Hermann Karl. Turntable. 3,977,636, Cl. 248-2.000.
Bunker Ramo Corporation: *See—*
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Buntin, Robert R.; Keller, James P.; and Harding, John W., to Exxon Research and Engineering Company. Melt blowing process. 3,978,185, Cl. 264-93.000.
Burger King Corporation: *See—*
Fogel, Joel D.; and Headberg, Dennis R., 3,977,390.
Burkholder, Ward J., to Goodyear Tire & Rubber Company, The. Process for producing polyphenols. 3,978,142, Cl. 260-621.00C.
Burnham, Robert D.; and Scifres, Donald R., to Xerox Corporation. Buried-heterostructure diode injection laser. 3,978,428, Cl. 331-94.50H.
Burrer, Gordon J. Infrared imaging system. 3,978,281, Cl. 178-7.700.
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. Process for the preparation of dienylphosphates. 3,978,171, Cl. 260-969.000.
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. Process for the preparation of dienylphosphates. 3,978,172, Cl. 260-973.000.
Burroughs Corporation: *See—*
Barton, Robert Stanley; Davis, Alan Lynn; Hauck, Erwin Arthur; Lyle, Don Martin; and Turner, Lloyd Drayton, 3,978,452.
Miller, Donald E., 3,978,371.
Wisner, Daniel A.; and Mihalik, Andrew S., Jr., 3,978,393.
Burry, Peter Edwin; and Kennedy, Roger Harley, to National Research Development Corporation. Apparatus for sensing particles. 3,978,397, Cl. 324-33.000.
Burstein, Albert H., to Sampson Corporation, The. Fluted subtrochanteric nail system. 3,977,398, Cl. 128-92.0BC.
Burton, Bernard Lee: *See—*
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Buschmann, Hans-Theo, to AFGA-Gevaert, A.G. Method of determining the modulation transfer function. 3,977,795, Cl. 356-256.000.
Bush, John W.; and Denholm, Michael J., to Borg-Warner Corporation. Vehicle brake proportioning mechanism. 3,977,735, Cl. 303-22.00R.
Bushee, Joseph J. Ball check valve construction with pressure-responsive reset means. 3,977,430, Cl. 137-460.000.
Bustard, Thomas Stratton; and Goslee, David Earl, to Nuclear Battery Corporation. Novel getter and process. 3,977,813, Cl. 417-49.000.
Buzzelli, Edward S., to Westinghouse Electric Corporation. Metal/air cells and improved air electrodes for use therein. 3,977,901, Cl. 136-86.00A.
Byington, Melville R., Jr. Motor vehicle economy measuring instrument. 3,977,238, Cl. 73-114.000.
C. F. Spiess & Sohn: *See—*
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Cabo, Amado; and Pops, Horace, to Essex International. Wrought brass alloy. 3,977,913, Cl. 148-11.50C.
Cairns, Thomas M.: *See—*
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Caldwell, Donald Lee; and Fuchs, Raymond John, Jr., to Dow Chemical Company, The. Insoluble electrode for electrolysis. 3,977,958, Cl. 204-252.000.
Calkins, Thornton R., to General Electric Company. Injection moldable thermosettable phenol-aldehyde resin composition and process. 3,978,012, Cl. 260-19.00R.
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Carn, Patrick. Trailer, particularly for transporting and launching boats. 3,977,690, Cl. 280-47.13B.
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Carson, William F., Jr., to Rohm and Haas Company. Thermal stabilization of acrylic polymers. 3,978,022, Cl. 260-45.70S.
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Cassano, James R.; Sullivan, William A.; and Krissel, Thomas M., to Xerox Corporation. Electrostatic reproduction method and apparatus. 3,977,780, Cl. 96-1.00M.
Cassel, Joe R. Connector. 3,977,800, Cl. 403-172.000.
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Chadbourne, Thomas G., to Walker Magnetics Group, Inc. Integrating fluxmeter with input current compensation to cancel drift. 3,978,399, Cl. 324-43.00R.

Chalmers, Edward L., to Garcia Corporation. Ski boot liner having adjustable width sizing. 3,977,098, Cl. 36-89.000.

Chamberlain, Charles Melvin. Dynamic carpet stretcher. 3,977,651, Cl. 254-57.000.

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Chandler, Ollie Wayne, to IMC Chemical Group, Inc. Priming nitromethane. 3,977,921, Cl. 149-2.000.

Chang, Harry L., to Mobil Oil Corporation. Oil recovery by alkaline-sulfonate waterflooding. 3,977,470, Cl. 166-273.000.

Chang, Henry C. Toilet accessory. 3,977,028, Cl. 4-254.000.

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Chastain, Lemuel J. Space enclosure. 3,977,138, Cl. 52-81.000.

Check, Axel. Adjustable line float. 3,977,115, Cl. 43-43.110.

Check, Frank T., Jr.; Eckert, Alton B., Jr.; and Warren, Joseph R., to Pitney-Bowes, Inc. Microcomputerized electronic postage meter system. 3,978,457, Cl. 340-172.500.

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Clark, Peter John; and Shanahan, Richard Sidney, to Strattwell Developments Limited. Washing of elongate materials. 3,977,220, Cl. 68-22.00R.

Clark, Raymond C., to Brunswick Corporation. Filtration method and apparatus. 3,977,847, Cl. 55-96.000.

Clarke-Gravely Corporation: *See—*
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Clauss, Robert C.: *See—*
United States of America, National Aeronautics and Space Administration; and Clauss, Robert C., 3,978,417.

Clavin, Edward Albert, to Mid-Continent Pipeline Equipment Company, a division of Harrisburg, Inc. Pipe scraper. 3,977,331, Cl. 15-104.170.

Clay, Roy T., Jr.; and Whiting, Lauren C., to Whiting Roll-Up Door Mfg. Corporation. Upwardly-acting door structure. 3,977,123, Cl. 49-102.000.

Clayton, Hadwen A., to Phillips Petroleum Company. Valve control apparatus and method. 3,977,423, Cl. 137-12.000.

Clayton Manufacturing Company: *See—*
Asmus, Carl Junior; and Wickersham, Woodrow Christman, 3,977,241.

Clerk, Robert Cecil. Control systems for hydraulic pumps and motors. 3,977,437, Cl. 137-625.660.

Cline, Harvey E.: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 3,977,910.

Clonts, Kenyon E., to Merichem Company. Liquid-liquid mass transfer apparatus. 3,977,829, Cl. 23-267.0MS.

Cluett, Peabody & Co., Inc.: *See—*
Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., 3,977,538.

Coates, Harold; Hoye, Peter Albert Theodore; and Wilkins, Anthony James, to Albright & Wilson Limited. Stabilization of polymeric compositions. 3,978,023, Cl. 260-45.75S.

Coates, Harold; Collins, John Desmond; and Siddiqui, Iftikhar Hussain, to Albright & Wilson Limited. Novel diorganotin maleate half esters and process for preparing same. 3,978,102, Cl. 260-429.700.

Coats & Clark, Inc.: *See—*
Einhorn, Ruediger, 3,978,189.

Cobaugh, Robert Franklin: *See—*
Lynch, James Edward; Parmer, Kenneth Ronald; and Cobaugh, Robert Franklin, 3,977,075.

Cochran, Steven C.; McFarland, Lawrence W.; and Weiss, Baltasar R., to Caterpillar Tractor Co. Gray iron casting composition with controlled iron-chromium carbide content. 3,977,867, Cl. 75-126.00A.

Codex Corporation: *See—*
Forney, George D., Jr.; and Hart, James C., 3,978,407.

Coffey, John Albert: *See—*
Stalley, Anthony Donald; and Coffey, John Albert, 3,978,519.

Cohan, Alvin M. Machine for simultaneous two image flexographic printing. 3,977,318, Cl. 101-38.00A.

Cohen, Norman Robert: *See—*
Crossfield, Roger John; and Cohen, Norman Robert, 3,977,979.

Cole, Carroll R.; Guhl, Richard E.; and Terry, Lloyd E., to Caterpillar Tractor Co. Framework for a wheeled self-propelled truck. 3,977,489, Cl. 180-89.00R.

Cole, Henry B., to American Optical Corporation. Method of making fiber optic device. 3,977,855, Cl. 65-4.00B.

Coleman Garden Plow Manufacturing Co., Inc.: *See—*
Coleman, Stephen N., 3,977,573.

Coleman, Stephen N., to Coleman Garden Plow Manufacturing Co., Inc. Seed planter attachment for garden plow. 3,977,573, Cl. 222-368.000.

Coleman, Steven J.; and O'Brien, James W., to Thermo Electron Corporation. Nasotracheal tube holder. 3,977,407, Cl. 128-348.000.

Collier, Donald C. Waveguide-tuned phased array antenna. 3,978,484, Cl. 343-754.000.

Collina, Amilcare; Malfatti, Emanuele; and Cappelli, Antonio, to Montecatini Edison S.p.A. Apparatus for the production of formaldehyde. 3,977,833, Cl. 23-288.00K.

Collins, John Desmond: *See—*
Coates, Harold; Collins, John Desmond; and Siddiqui, Iftikhar Hussain, 3,978,102.

Colorado Leisure Products, Inc.: *See—*
Gist, Lanny J., 3,977,722.

Colt Industries Operating Corporation (Firearms Division): *See—*
Silsby, Stanley D.; and Tatro, Henry J., 3,977,296.

Columbia Chemical Corporation: *See—*
Rosenberg, William E., 3,977,949.

Colwell, Charles J.: *See—*
Bloch, Heinz P.; and Colwell, Charles J., 3,977,972.

Combes, Andre: *See—*
Buathier, Bernard; Combes, Andre; and Jourdan, Jean-Paul, 3,978,198.

Combustion Engineering, Inc.: *See—*
Hill, Ernest C., 3,977,850.

Communications Satellite Corporation (Comsat): *See—*
Revesz, Akos G.; and Lindmayer, Joseph, 3,977,905.

Compagnie Generale d'Automatisme: *See—*
Baumberger, Philippe, 3,977,508.

Compagnie Generale de Radiologie: *See—*
Roux, Georges, 3,978,336.

Compagnie Generale d'Electricite: *See—*
Jacquelin, Jean, 3,977,903.

Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
Boileau, Jacques, 3,977,174.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Migeon, Rene; and Legrand, Yves, 3,978,391.

Computer Transmission Corporation: *See—*
Sanders, Ray W.; Keyes, Neil T.; Harting, Stephen W.; and Mueller, Donald J., 3,978,449.

Concast AG: *See—*
Marti, Heinrich; Barbe, Jacques; Gay, Pierre; and Vial, Raymond, 3,977,579.

Concept, Inc.: *See—*
Barton, Steve; Glorioso, John; and Foltz, Carl L., 3,978,312.

Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, to Hoffmann-La Roche Inc. Synthesis of biotin. 3,978,084, Cl. 260-332.20C.

Constanti, Jean, to Les Condensateurs Sic-Safco. Hermetic bushing for terminals for electrolytic filter capacitors. 3,978,377, Cl. 317-230.000.

Conte, Alfeo A., Jr.; and Hammond, J. Lee, to United States of America, Navy. Siliconc-base fire resistant hydraulic fluid. 3,977,986, Cl. 252-78.300.

Continental Oil Company: *See—*
Dew, John N.; Casad, Burton M.; Harlacher, Eugene A.; and Kleinpeter, Joseph A., 3,977,843.

Control Concepts, Inc.: *See—*
Zeuner, Kenneth W.; and Jarman, Alonzo B., 3,977,649.

Control Electronics Co., Inc.: *See—*
Goldstein, Harold; and Montren, William, 3,978,325.

Control Process, Incorporated: *See—*
Groleau, Rodney J.; and Paulson, Donald C., 3,977,255.

Conway, Edmund J.: *See—*
United States of America, National Aeronautics and Space Administration; Rogowski, Robert S.; Richards, Ralph R.; and Conway, Edmund J., 3,977,831.

Conwed Corporation: *See—*
Sundin, George Holger, 3,977,627.

Cook, Herbert B. Furniture upholstery stand. 3,977,662, Cl. 269-60.000.

Cooke, George A.; and Houlihan, William J., to Sandoz, Inc. 2-Amino-4,5-methylenedioxyphenyl nitriles. 3,978,086, Cl. 260-340.500.

Cooke, William C., to ASG Industries, Inc. Method for producing intricate metal designs on glass. 3,978,249, Cl. 427-99.000.

Coon, Clifford L., to United States of America, Army. Preparation of octahydro-1,3,5,7-tetraalkanoyl-1,3,5,7-tetrazocines. 3,978,046, Cl. 260-239.0BC.

Coors Porcelain Company: *See—*
Martin, Robert M., 3,978,269.

Copal Company Limited: *See—*
Matsumoto, Kunio, 3,978,496.

Copeland, Edward A.: *See—*
Lynch, Charles R.; Copeland, Edward A.; and White, William D., 3,977,234.

Coran, Aubert Yaucher; and Lambright, Arthur James, to Monsanto Company. Integral pneumatic tire and wheel molded entirely from homogeneous material containing elastic polymer. 3,977,453, Cl. 152-323.000.

Coran, Aubert Yaucher; and Lambright, Arthur James, to Monsanto Company. Integral pneumatic tire and wheel comprising a wheel portion with axially spaced members. 3,977,454, Cl. 152-323.000.

Corkran, William F.: *See—*
Poffenberger, James C.; Corkran, William F.; Siter, Ralph B., Jr.; and Champa, Raymond J., 3,978,276.

Cornelius Company, The: *See—*
Rosa, Ronald L., 3,977,689.

Cornett, Walter G., III; and Gaspar, Donald G., to Respiratory Care, Inc. Unitary thermoplastic container having breakaway cap which protects sterile interior access barrier. 3,977,553, Cl. 215-32.000.

Corning Glass Works: *See—*
Dumbaugh, William H., Jr.; Genisson, Roger R.; and Lestrat, Michel R., 3,978,362.
Hertl, William, 3,977,982.
Martin, Francis W.; and Rose, Paul L., 3,978,315.
Rose, Paul L.; Whitney, William P.; and Williams, Thomas, 3,978,316.

Coronelli, Carolina; Parenti, Francesco; White, Richard; and Pagani, Hermes, to Gruppo Lepetit S.p.A. Lipiarmycin and its preparation. 3,978,211, Cl. 424-120.000.

Cosden Technology, Inc.: *See—*
Teer, Glenn E.; Higgins, Jerry G.; and Warren, George D., 3,978,017.

Coson, James R.: *See—*
Royer, John A., 3,977,610.

Costa, Allan. Child-proof closure device for a container having a threaded neck portion. 3,977,554, Cl. 215-220.000.

Couchman, Richard, to Aluminum Company of America. Forging method. 3,977,225, Cl. 72-265.000.

Coulter Electronics, Inc.: *See—*
Liedholz, Gerhard A., 3,977,794.

Coulter Information Systems, Inc.: *See—*
Talmage, Peter Guy, 3,978,380.

Cousino, Bernard A., to Cousino Corporation. Storage cell assembly. 3,977,523, Cl. 206-387.000.

Cousino Corporation: *See—*
Cousino, Bernard A., 3,977,523.

Cove, Harry R.: *See—*
Muchow, John D.; and Cove, Harry R., 3,977,438.

Cowdrick, Oakley. Method of finishing a foil. 3,977,133, Cl. 51-328.000.

Crane, Herbert R., to Hobart Corporation. Pivoted drive and mount for meat scraping machine. 3,977,035, Cl. 15-3.170.

Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., to Cluett, Peabody & Co., Inc. Apparatus for manufacturing and stacking hemmed fabric pieces. 3,977,538, Cl. 214-6.500.

Crawford, John T.; and Shaffer, Walter M., to Towmotor Corporation. Side handling attachment. 3,977,550, Cl. 214-730.000.

Creighton, Peter J.: *See—*
Forster, Eric O.; and Creighton, Peter J., 3,977,089.

Cremonese, Otto A. Solar heat energy conversion system. 3,977,909, Cl. 136-206.000.

Crichlow, Walter W.: *See—*
Erickson, John W.; and Crichlow, Walter W., 3,977,810.

Crisman, Everett; and Armitage, William F., Jr. Photovoltaic device having polycrystalline base. 3,978,333, Cl. 250-211.00J.

Cristie, Martin, to Stelber Industries Inc. Brake levers for bicycles. 3,977,270, Cl. 74-480.00R.

Crooks, Walter, to International Business Machines Corporation. Electrophotographic developer with fibers of polytetrafluoroethylene. 3,977,871, Cl. 96-15.00D.

Cross, Milton Ralph: *See—*
Forusz, Samuel Laurence; Vinczi, William Frank; and Cross, Milton Ralph, 3,977,202.

Cross, Thomas R.; and George, Clifford Lloyd, to Xerox Corporation. Sorting apparatus. 3,977,667, Cl. 271-64.000.

Crossfield, Roger John; and Cohen, Norman Robert, to George A. Goulston Company, Inc. Yarn finish formulations. 3,977,979, Cl. 252-8.800.

Crossmore, Edward Y., Jr., to Miller, Clyde L.; and Leasure, William C., part interest to each. Agglomeration of finely divided particles. 3,977,892, Cl. 106-288.00B.

CRS Industries, Inc.: *See—*
Oliphant, Kenward S., 3,977,848.

Cseh, Georg; and Roueche, Armand, to Ciba-Geigy Corporation. Disazo pigments containing at least one nitro group on the diazo component. 3,978,038, Cl. 260-176.000.

CSELT - Centro Studi e Laboratori Telecomunicazioni SpA: *See—*
Luvison, Angelo; and Pirani, Giancarlo, 3,978,435.

Csermely, Gyorgy: *See—*
Szoke, Sandor; Lugosi, Gyorgy; Csermely, Gyorgy; Bakonyi, Maria; Zsolnai, Tibor; and Szepessy, Istvan, 3,978,217.

Cuddihy, Edward F.: *See—*
United States of America, National Aeronautics and Space Administration; Broyles, Howard F.; Moacanin, Jovan; and Cuddihy, Edward F., 3,978,187.

Culpepper, Will Lester, to Mead Corporation, The. Machine and method for supplying article carriers for application to groups of articles. 3,977,150, Cl. 53-3.000.

Cummins Engine Company, Inc.: *See—*
Mote, Charles R.; and Fleetwood, Willard E., 3,977,064.
Reid, David L.; Flynn, Patrick F.; and Eberhard, Walter Wayne, 3,977,376.
Reid, David L., 3,977,377.

Cummins, Robert P.; and Hunt, Paul C., to Minnesota Mining and Manufacturing Company. Temperature and supply voltage compensated amplifying device. 3,978,419, Cl. 330-30.00D.

Cunniff, John G.: *See—*
Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., 3,977,957.

Curchod, Albert; and Luporini, Aime. Power regulating arrangement for a three phase electrode-type water heater. 3,978,313, Cl. 219-285.000.

Curtis, John S. Multiple duct underground conduit. 3,977,703, Cl. 285-26.000.

Curtiss-Wright Corporation: *See—*
Roberts, Thomas C., 3,977,367.

Dai Nippon Insatsu Kabushiki Kaisha: *See—*
Okuma, Yoshihisa; Toida, Takashi; and Tsunoda, Ichiro, 3,977,767.

Dai Nippon Toryo Kaubshiki Kaisha: *See—*
Nakamura, Kenji; Yaguchi, Mashachika; Jinnai, Toshio; Totani, Kazuo; Furuta, Shigetaro; and Nichogi, Masayoshi, 3,977,768.

Daimler-Benz Aktiengesellschaft: *See—*
Flaig, Manfred, 3,977,490.
Kleinschmit, Einhard, 3,977,486.
Tank, Eggert, 3,977,465.

Dalla Vecchia, Gino, to Giuseppe Sperotto S.p.A. Apparatus for turning a tubular fabric inside out. 3,977,580, Cl. 223-43.000.

Dalmau, Jose Ma: *See—*
Lombardi, Victor J.; and Dalmau, Jose Ma, 3,977,216.

Daniels, Phillip D., to Novi Plastics Company. Wall paneling. 3,977,136, Cl. 52-35.000.

Dany, Franz-Josef: *See—*
Vollmer, Hartfrid; Dany, Franz-Josef; and Wortmann, Joachim, 3,978,170.

Dasher, George F.: *See—*
Reever, Richard E.; and Dasher, George F., 3,977,151.

Data General Corporation: *See—*
Romeo, Frank Candilora; and Carroll, John Warren, III, 3,978,318.

Dataproducts Corporation: *See—*
Mogtader, Charles S., 3,977,319.

Daugirda, Paul G.: *See—*
Strobach, Carl G.; Daugirda, Paul G.; and Fahey, William E., 3,978,309.

Daumas, Jean-Claude; Dupuy, Georges; and Michel, Max, to Rhone-Progil. Catalysts for the treatment of gases containing various derivatives of sulphur. 3,978,004, Cl. 252-462.000.

d'Auria, Luigi; Le Guen, Benoit; and Spitz, Erich, to Thomson-CSF. Variable coupler for optical fibers. 3,977,764, Cl. 350-96.00C.

Davies, David Huw: *See—*
Mallams, Alan K.; and Davies, David Huw, 3,978,214.

Davies, Robert William; Veness, Maxwell Francis; Thornton, Leonard; and Calver, Leonard Henry, to Molins Limited. Packing machines. 3,977,157, Cl. 53-207.000.

Davies, Wynn Price: *See—*
Dodsworth, Edward; Gaunt, Thomas Norman; Davies, Wynn Price; and Wilkins, David Reed, 3,978,232.

Davis, Alan Lynn: *See—*
Barton, Robert Stanley; Davis, Alan Lynn; Hauck, Erwin Arthur; Lyle, Don Martin; and Turner, Lloyd Drayton, 3,978,452.

Davy-Locwy Limited: *See—*
Stubbins, Derek, 3,977,224.

Davydov, Anatoly Borisovich: *See—*
Khromov, Gennady Lvovich; Davydov, Anatoly Borisovich; Maichuk, Jury Fedorovich; and Tishina, Inna Fedorovna, 3,978,201.

De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie: *See—*
Leersnijder, Carolus Pieter, 3,977,509.

de Bartolome, Charles Arthur Martin: *See—*
Shearer, Charles John; and de Bartolome, Charles Arthur Martin, 3,977,657.

DeBaun, Jack R.; Pallos, Ferenc M.; and Baker, Don R., to Stauffer Chemical Company. 5-Furoyl-2,2,4-trimethyl-1,4-dihydro-1H-1,5-benzodiazepine as an anti-inflammatory agent. 3,978,227, Cl. 424-285.000.

DeBaun, Jack R.: *See—*
Pallos, Ferenc M.; and DeBaun, Jack R., 3,978,202.
Pallos, Ferenc M.; and DeBaun, Jack R., 3,978,219.

Decamp, Rene Paul Auguste: *See—*
Perronin, Jean; and Decamp, Rene Paul Auguste, 3,978,016.

Decker, Marie-Therese: *See—*
Smadja, Dora; Decker, Marie-Therese; Derouet, Francoise; and Lorin, Guy, 3,977,912.

Deely, Carroll Leo. Universally movable mirror with a universal mounting clamp. 3,977,645, Cl. 248-484.000.

Deering Milliken Research Corporation: *See—*
Gilpatrick, Michael William, 3,977,055.
Gilpatrick, Michael William, 3,977,056.

DeFord, Donald D., to Phillips Petroleum Company. Chromatographic analyzer signal resolution. 3,978,415, Cl. 328-165.000.

Degner, Raymond L., to Semimetals, Inc. Removal-compensating polishing apparatus. 3,977,130, Cl. 51-131.000.

Deimer, Karl-Heinz: *See—*
Wunsch, Erich; Wendlberger, Gerhard; Jaeger, Ernst; Scharf, Regine; Deimer, Karl-Heinz; and Stocker, Hans, 3,978,035.

Deininger, Rolf; and Wolf, Erich, to Klosterfrau Berlin. Process for the manufacture of a dry foodstuff powder containing fats, proteins and carbohydrates. 3,978,245, Cl. 426-585.000.

Deitrich, Jerry D., to Raymond Lee Organization, Inc., The. Game using a board and playing pieces. 3,977,681, Cl. 273-135.0AC.

Delalande S.A.: *See—*
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M; and Gouret, Claude J., 3,978,055.

Delgado Delgado, Luis, to Vicon Espana S.A. Side delivery rake. 3,977,166, Cl. 56-366.000.

DeLime, Thomas L., III, to Firetek Corporation. Three wire detection circuit. 3,978,461, Cl. 340-227.00R.

Dell, Hans-Dieter: *See—*
Badicke, Gerd; Dell, Hans-Dieter; and Pitzken, Albrecht, 3,978,220.

Delligatti, Patrick. Printing wheel. 3,977,317, Cl. 101-35.000.

DelVecchio, George D., to Xerox Corporation. Corona generating device with an improved cleaning mechanism. 3,978,379, Cl. 317-262.00A.

Demerson, Christopher A.: *See—*
Philipp, Adolf H.; Demerson, Christopher A.; and Humber, Leslie G., 3,978,066.

Dengel, Ottmar H.: *See—*
Beckert, Werner F.; Barber, William H.; Dengel, Ottmar H.; and Robb, Robert A., 3,977,990.

Denham, Keith: *See—*
Alvi, Zea Raheem; Bradley, William David; Denham, Keith; and Summerlin, Frederick Arthur, 3,977,229.

Denholm, Michael J.: *See—*
Bush, John W.; and Denholm, Michael J., 3,977,735.

Dennis, Colin; Holt, Arthur Denys; and Moore, Patrick William Henry, to Erie Electronics Limited. Fusible resistor. 3,978,443, Cl. 338-309.000.

Derouet, Francoise: *See—*
Smadja, Dora; Decker, Marie-Therese; Derouet, Francoise; and Lorin, Guy, 3,977,912.

Descary, John Gilbert; and Krishnan, Ramamurthy Gopal, to Dominion Engineering Works, Limited. Support beam for the rectifier section of a headbox. 3,977,938, Cl. 162-343.000.

Deseret Pharmaceutical Co., Inc.: *See—*
Moorehead, Harvey Robert, 3,977,400.

Dettmeier, Udo: *See—*
Ohorodnik, Alexander; Dettmeier, Udo; Gehrmann, Klaus; and Berns, Heinz-Josef, 3,978,146.

Deuel, Ronald F., to Mohawk Data Sciences Corporation. Reversible drive for flexible web. 3,977,620, Cl. 242-67.400.

Deutsche Edelstahlwerke Aktiengesellschaft: *See—*
Sobottka, Gert; Pagenkemper, Peter; Eisenburger, Heinrich; and Schoof, Werner, 3,978,441.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Friedrich, Heinz; and Neugebauer, Walter, 3,978,136.
Meyer-Simon, Eugen; Schwarze, Werner; Thurn, Friedrich; and Michel, Rudolf, 3,978,103.
Oelmann, Alfred; Engel, Claus Richard; and Rothbuhr, Lothar, 3,978,019.

de Vries, Hans, to Zellweger Uster Ltd. Current-supply arrangement for an electronic remote control receiver. 3,978,388, Cl. 321-10.000.

Dew, John N.; Casad, Burton M.; Harlacher, Eugene A.; and Kleinpeter, Joseph A., to Continental Oil Company. Purification process for coal gas methanation. 3,977,843, Cl. 48-197.00R.

DeWitt, F. Carlos. Posse box report clip board. 3,977,744, Cl. 312-231.000.

D'Hollander, Omer A. E. Entirely hydraulic loading platform for trucks. 3,977,544, Cl. 214-77.00P.

Diamond Die & Mold Co.: *See—*
Baldyga, Joseph W.; and Cairns, Thomas M., 3,977,587.

Diamond Shamrock Corporation: *See—*
Strong, Douglas H., 3,978,151.

DiCecco, Enio; and Totti, Mario Costante, to Safe Electronic Systems S.A. Apparatus for restoring cathode-ray tubes. 3,977,745, Cl. 316-28.000.

Dickore, Karlfried; Draber, Wilfried; Timmler, Helmut; Eue, Ludwig; and Schmidt, Robert R., to Bayer Aktiengesellschaft. Azomethine compounds of 4-amino-5-H-1,2,4-triazin-5-ones and herbicidal compositions containing them. 3,978,068, Cl. 260-240.00G.

Digoy, Jean-Louis, to U.S. Philips Corporation. Semiconductor diode and method of manufacturing same. 3,978,511, Cl. 357-30.000.

Dill, Donald S.: *See—*
Hooker, Derrell C., 3,977,279.

Dimeff, John; and Kerwin, William J., to United States of America, National Aeronautics and Space Administration. Integrated structure vacuum tube. 3,978,364, Cl. 313-306.000.

Disselnkotter, Hans: *See—*
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 3,978,223.
Ditlinger, Richard J., to Bendix Corporation, The. Tension-torsion tie bar. 3,977,274, Cl. 74-579.00R.
Dixon, Don P.; and Kobel, George B. Automobile air conditioning system. 3,977,814, Cl. 417-364.000.
Doane, Tuthill Saunders. Wrap-spring, variable speed drive arrangement. 3,977,261, Cl. 74-88.000.
Dobbins, Thomas Edward; Hanson, William Duane; and Wenzel, Ronald Eugene, to American Can Company. Substantially curl-free semi-rigid support member for food packages. 3,978,260, Cl. 428-204.000.
Dobby, Gerald B.; and Henderson, David, to Hunter Douglas International N.V. Horizontal siding panel joint support. 3,977,145, Cl. 52-531.000.
Dobkin, Robert C., to National Semiconductor Corporation. Measurement system for timer. 3,978,322, Cl. 235-92.00T.
Dodsworth, Edward; Gaunt, Thomas Norman; Davies, Wynn Price; and Wilkins, David Reed. Thin walled containers for pressurized liquids. 3,978,232, Cl. 426-115.000.
Doggett, Robert E. Portable hand-carried automobile counting device. 3,978,321, Cl. 235-92.0TC.
Dolby Laboratories, Inc.: *See—*
Dolby, Ray Milton; and Spencer, Paul Anthony, 3,978,409.
Dolby, Ray Milton; and Spencer, Paul Anthony, to Dolby Laboratories, Inc. Signal compressors and expanders. 3,978,409, Cl. 325-62.000.
Dolco Packaging Corporation: *See—*
Hillgenberg, David E., 3,977,595.
Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. 7-Methoxy 7-α-ureidothienylacetamidocephalosporins. 3,978,051, Cl. 260-243.00C.
Domaingue, George Hector, Jr., to Brunswick Corporation. Process and apparatus for production of precision cut lengths of metal wires and fibers. 3,977,069, Cl. 29-424.000.
Dominion Engineering Works, Limited: *See—*
Descary, John Gilbert; and Krishnan, Ramamurthy Gopal, 3,977,938.
Donley, Harold E., to PPG Industries, Inc. Coated article for solar control and process for its production. 3,978,272, Cl. 428-434.000.
Donnelly Mirrors, Inc.: *See—*
Kurz, Arthur W., Jr.; and Wilson, Harold R., 3,978,190.
D'Ottavio, Eugenc D.: *See—*
Lombardo, Michael S.; Jacovich, Elaine F.; D'Ottavio, Eugene D.; and Grunwald, John J., 3,978,252.
Douno, Syugo, to Glory Kogyo Kabushiki Kaisha. Stacking apparatus for use with paper security validation apparatus or the like. 3,977,669, Cl. 271-180.000.
Dove, Allan B.; and Hunsberger, Allen C., to Steel Company of Canada, Limited, The. Floor nail. 3,977,142, Cl. 52-363.000.
Dow Chemical Company, The: *See—*
Caldwell, Donald Lee; and Fuchs, Raymond John, Jr., 3,977,958.
Schrenk, Walter J., 3,977,153.
Smith, Hubert Stacy, Jr., 3,978,255.
Tigner, Reuben A.; and Berg, James W., 3,978,378.
Dowke, Gosaburo: *See—*
Yoshinaga, Eiichi; Wakamori, Shigeki; Dowke, Gosaburo; and Takita, Kiyoshi, 3,978,228.
Dowty Seals Limited: *See—*
Hillier, Edward Francis Herbert Benjamin; and Walker, Robin Anthony, 3,978,265.
Draber, Wilfried: *See—*
Dickore, Karlfried; Draber, Wilfried; Timmler, Helmut; Eue, Ludwig; and Schmidt, Robert R., 3,978,068.
Drahtwarenfabrik Drahtzug Stein KG: *See—*
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Dravo Corporation: *See—*
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Duba, Eugene B. Golf bag hood rain cover. 3,977,451, Cl. 150-1.50R.
Dumbaugh, William H., Jr.; Genisson, Roger R.; and Lestrat, Michel R., to Corning Glass Works. Glass envelope for tungsten-bromine lamp. 3,978,362, Cl. 313-221.000.
Duncan, Ernest R. Teaching machine card. 3,977,092, Cl. 35-48.00A.
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Edwards, Thomas C., to Rovac Corporation, The. Compressor-expander with volume compensation. 3,977,852, Cl. 62-402.000.
Edwards, William John, to John Lysaght (Australia) Limited. Hot strip mill tension control. 3,977,223, Cl. 72-17.000.
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Egger, Joseph, to Timex Corporation. Electric alarm watch. 3,977,177, Cl. 58-57.500.
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Eilingsfeld, Heinz; and Patsch, Manfred, to BASF Aktiengesellschaft. Production of 1-chloroanthraquinone. 3,978,096, Cl. 260-384.000.
Eilingsfeld, Heinz; and Patsch, Manfred, to BASF Aktiengesellschaft. Manufacture of o-benzyltoluenes. 3,978,144, Cl. 260-649.00R.
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Engelhardt, Edward L.; and Christy, Marcia E., to Merck & Co., Inc. Tetrafluorophenethylaralkylamine compounds. 3,978,127, Cl. 260-570.50R.

Engstrom, Keith Allen, to Illinois Tool Works Inc. Keyboard with N-key lockout and two-key rollover protection. 3,978,474, Cl. 340-365.00E.

Eppe, Rudolf; Schnall, Gunther; Abbe, Gunter; and Ettelbruck, Rudiger, to AGFA-Gevaert, A.G. Exposure system for electrophotographic copying apparatus. 3,977,781, Cl. 355-18.000.

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Erickson, Henry, to Atlantic Richfield Company. Alumina compositions and methods for making and using same. 3,977,999, Cl. 252-441.000.

Erickson, John W.; and Crichlow, Walter W., to Kobe, Inc. Multiple outlet, constant flow, pitot pump. 3,977,810, Cl. 415-89.000.

Erickson, Ronald E., to Sybron Corporation. Method of filter molding and electrical heating unit made thereby. 3,978,183, Cl. 264-87.000.

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Estep, Gordon J.; and Burton, Bernard Lee, to Bendix Corporation, The. Solderable thin film microcircuit with stabilized resistive films. 3,977,840, Cl. 29-195.000.

Estmar, Ernst Goran: *See—*
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Estrada, Joe Jess: *See—*
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Ethridge, Fredrick Allen; Taylor, Michael Paul; and Thompson, Scott Winfield, to Fiber Industries, Inc. Textile fluid crimping process and apparatus. 3,977,059, Cl. 28-72.110.

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Ettlinger, Ralph, Jr.; and Kostohryz, Frank J., to Avant Industries, Inc. Construction for clearing tableware from trays. 3,977,549, Cl. 214-318.000.

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Evans, William Joshua; Grant, Wesley Norman; and Murphy, Bernard Thomas, to Bell Telephone Laboratories, Incorporated. Integrated injection logic using oxide isolation. 3,978,515, Cl. 357-44.000.

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Graham, John W.; Gruesbeck, Clay; and Salathiel, William M., 3,977,472.

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Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, to Warner-Lambert Company. 3-(Chlorocetamido)-5-methyl isoxazole. 3,978,073, Cl. 260-307.00H.

Fabry, William F.; and Hersley, Dennis C., to National Semiconductor Corporation. Pocket calculator. 3,978,328, Cl. 235-156.000.

Fahey, William E.: *See—*
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Fahrbach, Gerhard: *See—*
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Fallen, Burke R. Buffing machine. 3,977,421, Cl. 134-6.000.

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Farr, Glyn Phillip Reginald, to Girling Limited. Shoe drum brakes for vehicles. 3,977,500, Cl. 188-106.00A.

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Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M; and Gouret, Claude J., to Delalande S.A. Arylamino pyrimidinic derivatives. 3,978,055, Cl. 260-247.50D.

Faust, Kenneth J.; and Maass, Richard L., to GAF Corporation. Embossed decorative sheet-type material and process for making same. 3,978,258, Cl. 428-159.000.

Favilli, Riccardo Aldo; Lewis, J. Stephen; and Ratcliffe, Alfonso Fred, to Mattel, Inc. Figure toy having tuned sound producers and indicia. 3,977,292, Cl. 84-470.000.

Fecher, Walter, to Drahtwarenfabrik Drahtzug Stein KG. Reeling spool. 3,977,622, Cl. 242-77.200.

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Federal Paper Board Company, Inc.: *See—*
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Fertin, Jacques, to U.S. Philips Corporation. Electroluminescent device having localized emission. 3,978,507, Cl. 357-17.000.

Ferwagner, Josef. Tool for forming pipe from sheet metal. 3,977,228, Cl. 72-384.000.

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Fingerson, Conrad F.; Durhman, Paul P.; Gove, James E.; and Meyer, Daniel, to AFC, Inc. Post and clip construction for the wire fences. 3,977,653, Cl. 256-10.000.
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Finsterwalder, Ulrich; and Finsterwalder, Klemens, to Dyckerhoff & Widmann Aktiengesellschaft. Tank ship, especially liquified gas tank ship. 3,977,350, Cl. 114-74.00A.
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Fisher, James B., Jr. Bird feeder. 3,977,363, Cl. 119-52.00R.
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Fisk, Allan T.; and Peterson, Carl R., to Rapidex, Inc. Boring apparatus. 3,977,481, Cl. 175-228.000.
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Foote, Daniel J., to Master Lock Company. Tamper-proof set screw assemblage for locking devices. 3,977,221, Cl. 70-58.000.
Ford, David Norman; and Tankey, Howard William, to ICI Australia Limited. Elastomeric particles having polymerizable surface layer. 3,978,261, Cl. 428-212.000.
Forney, George D., Jr.; and Hart, James C., to Codex Corporation. Fast start-up adaptive equalizer communication system using two data transmission rates. 3,978,407, Cl. 325-42.000.
Forster, Eric O.; and Creighton, Peter J., to Exxon Research and Engineering Company. Microwave drying process for synthetic polymers. 3,977,089, Cl. 34-1.000.
Forsyth, Bruce Adam; and Warner, Richard Burridge, to ICI Australia Limited. Method of eradicating internal parasites. 3,978,060, Cl. 424-270.000.
Forusz, Samuel Laurence; Vinczi, William Frank; and Cross, Milton Ralph, to Johnson & Johnson. Cold pack device. 3,977,202, Cl. 62-4.000.
Foster, Karl; and Thornburg, Donald R., to Westinghouse Electric Corporation. Method of producing doubly oriented cobalt iron alloys. 3,977,919, Cl. 148-121.000.
Fotiu, Eustace; Lanzet, Monroe; and Russ, Julio, to Revlon, Inc. Pressed powder cosmetic composition. 3,978,207, Cl. 424-63.000.
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Freitag, Wolfgang. Coaxial cable connector. 3,977,752, Cl. 339-95.00A.
Frerking, Marvin E., to Rockwell International Corporation. Radio receiver noise suppression. 3,978,412, Cl. 325-478.000.
Frey, Irwin K.; and Zola, Charles L. Methods of warming food between moveable spring biased heater means. 3,978,238, Cl. 426-523.000.
Freytag, Wolfram Gustav; Ney, Karl Heinz; and Wirotama, I. Poetoe Gde, to Lever Brothers Company. Cheese flavor. 3,978,242, Cl. 426-537.000.
Fried, John H.; and Harrison, Ian T., to Syntex Corporation. 2-Naphthyl acetic acid derivatives and compositions and methods thereof. 3,978,116, Cl. 260-500.50H.
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Holford, John George. Floatable concrete structures. 3,977,344, Cl. 114-.50F.
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Holopainen, Vaino J. Material handling apparatus. 3,977,547, Cl. 214-131.00R.
Holt, Arthur Denys: *See—*
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Holt, William Gilbert, to Hercules Incorporated. Container-lid interlock. 3,977,563, Cl. 220-306.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
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Hooker, Derrell C., to Hooker, Derrell C.; Maxwell, James, Jr.; and Dill, Donald S., part interest to each. Lathe for generating spherical or aspherical surfaces on workpieces. 3,977,279, Cl. 82-14.00R.
Hoover Ball and Bearing Company: *See—*
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Horan, Robert T., to Will Ross, Inc. Belt closure for sterile back surgical gown or the like. 3,977,025, Cl. 2-114.000.
Horner, Joseph L., to United States of America, National Aeronautics and Space Administration. Optical noise suppression device and method. 3,977,771, Cl. 350-162.0SF.
Horstmann, Harald: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 3,978,077.
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Howell, Rufus J. Scope guard. 3,977,113, Cl. 42-1.00S.
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Hubbard, Warren M., to Rohr Industries, Inc. Solar energy concentrator. 3,977,773, Cl. 350-292.000.

Huber, Josef, to Siemens Aktiengesellschaft. Program-controlled data processor having two simultaneously operating identical system units. 3,978,327, Cl. 235-153.0AE.

Hudgins, Wayne A., to United States of America, Army. Compound helicopter drive means. 3,977,812, Cl. 416-123.000.

Huffman, Harold Walter, to Hamilton Tool Company, The. Differential driven rewinder-unwinder. 3,977,621, Cl. 242-75.500.

Hughes Aircraft Company: *See—*
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Hughes, Howard C., Jr.; Brownlee, Robert R.; and Tyers, G. Frank O., to Research Corporation. Cardiac pacer system and method. 3,977,411, Cl. 128-419.00P.

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Hugi, Rolf: *See—*
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Hukuba, Hiroshi; Ikegami, Iwao; and Yasuda, Teruaki, to Hukuba, Hiroshi. Controlling apparatus for driving gear in suction cleaner. 3,977,038, Cl. 15-339.000.

Hulls, Leonard Robin; and Hadden, Stephen Clow, to RCA Corporation. Engine diagnosis from frequency components in exhaust. 3,977,239, Cl. 73-115.000.

Hultgren, Claes L. Slide storage tray. 3,977,519, Cl. 206-216.00C.

Humber, Leslie G.: *See—*
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Humphreys, James W., to Sealed Power Corporation. Roller tappet. 3,977,370, Cl. 123-90.500.

Hunley, Robert M., Jr. Safety gutter protection device. 3,977,135, Cl. 52-12.000.

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Hunter, George C.; and Zanoni, Carl A., to Zygo Corporation. Scanning differential photoelectric autocollimator. 3,977,789, Cl. 356-120.000.

Hunter, John C. Oil based adhesion of film to window. 3,977,930, Cl. 156-71.000.

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Hurst, John W., to Chrysler Corporation. Clutch. 3,977,503, Cl. 192-21.000.

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Huston, Paul O.; and Freeborn, John O., to International Paper Company. Disposable forceps. 3,977,410, Cl. 128-354.000.

Hwa, Stephen C. P., to Xerox Corporation. Method for cleaning a support surface. 3,977,898, Cl. 134-6.000.

Hydrocarbon Research, Inc.: *See—*
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Ichikawa, Yataro; and Yamamoto, Mamoru, to Teijin Limited. Process for the preparation of unsaturated carbonyl compounds. 3,978,092, Cl. 260-347.800.

ICI Australia Limited: *See—*
Ford, David Norman; and Tankey, Howard William, 3,978,261.
Forsyth, Bruce Adam; and Warner, Richard Burridge, 3,978,060.

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Yamaguchi, Shunzo; Igashira, Toshihiko; and Hujita, Masami, 3,977,368.

Igeta, Harutoshi. Seat belt equipment. 3,977,696, Cl. 280-744.000.

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Inamine, Edward; and Birnbaum, Jerome, to Merck & Co., Inc. Fermentation of cephamycin C. 3,977,942, Cl. 195-80.00R.

Inca Inks, Inc.: *See—*
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Ing. C. Olivetti & C., S.p.A.: *See—*
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Inoue, Kazuhiro; Sato, Hiroshi; and Matsui, Fumio, to Nippon Oils and Fats Company Limited. Capsulated explosive compositions. 3,977,922, Cl. 149-2.000.

Inoue, Shinzi: *See—*
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Ippen, Erich Peter; and Shank, Charles Vernon, to Bell Telephone Laboratories, Incorporated. Mode-locked laser. 3,978,429, Cl. 331-94.50M.

Isaacs, Thelma J.; Gottlieb, Milton S.; Feichtner, John D.; and Price, Andrea A., to Westinghouse Electric Corporation. $Tl_3VS_4Tl_3NbS_4$ crystals and acousto-optical devices. 3,977,770, Cl. 350-161.000.

Iscowitz, Sigmund, to Clairol Incorporated. Terpenoid stabilizers in aerosol co-dispensing hair coloring systems. 3,977,826, Cl. 8-10.200.

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Ishikawa Manufactory Company, Limited: *See*—
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Ishikawa, Soji, to Ishikawa Manufactory Company, Limited. Apparatus for loading a medical needle holder with a filter element. 3,977,060, Cl. 29-33.00S.
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Issel, Wolfgang. Process and apparatus for the determination of concentration profiles of liquid or gaseous substances. 3,977,233, Cl. 73-40.50R.
Italsider S.p.A.: *See*—
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Iwai, Hiroshi: *See*—
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Jacobsen, Kjell Ole; and Troen, Edvard, to A/S Raufoss Ammunisjonsfabrikker. Combustible cartridge casings and method for making same. 3,977,325, Cl. 102-43.00R.
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Jahn, Gunter, to Motoren- und Turbinen-union Friedrichshafen GmbH. Internal combustion engine oil pressure loss safety device. 3,977,384, Cl. 123-198.0DB.
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James, Varnell L., to Boeing Company, The. Three-dimensional monocoque open-ended annular structure. 3,978,256, Cl. 428-66.000.
Jancis, Elmar Harry, to Uniroyal Inc. Method of making hydroxyarylbenzotriazoles and their N-oxides. 3,978,074, Cl. 260-308.00B.
Japan Carlit Company, Ltd., The: *See*—
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Jariwala, Praveen K., to Westinghouse Electric Corporation. Cathode ray tube second electrode having rectangular projecting ridge. 3,978,367, Cl. 313-449.000.
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Jaunarajs, Karlis L.; and Yang, Julie C., to Johns-Manville Corporation. Method for the preparation of fibrous calcium sulfate hemihydrate. 3,977,890, Cl. 106-109.000.
Jean Walterscheid GmbH: *See*—
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Jenny, Robert William, to Boeing Company, The. Aircraft wheel drive apparatus and method. 3,977,631, Cl. 244-50.000.
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Johansson, Carl-Eric, to SKF Industrial Trading and Development Company, B.V. Flexible coupling. 3,977,212, Cl. 64-14.000.
Johansson, Sven-Olof, to Aktiebolaget Carl Munters. Room air conditioning apparatus. 3,977,466, Cl. 165-40.000.
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Johnson, Anderson F., Jr.; Stork, Edward L.; and Winings, Richard H., to Western Electric Company, Inc. Methods for treating articles. 3,977,926, Cl. 156-17.000.
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Jones, William C.; and Harwood, Clifford, to Jones Medical Instrument Company. Computerized pulmonary analyzer. 3,977,394, Cl. 128-2.070.
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Kansas University Endowment Association: *See*— Hinton, Robert A.; and Kurata, Fred (said Fred Kurata assors. to), 3,977,203.
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Broussard, Douglas E.; Scott, Paul R.; and Kruka, Vitold R., 3,977,469.

Krylova, Eleonora Dmitrievna; and Brazhnikov, Nikolai Ivanovich. Method and apparatus for controlling liquid pressure in pipelines. 3,977,252, Cl. 73-398.00R.

Kubik, Philip A. Reservoir housing. 3,977,189, Cl. 60-453.000.

Kubo, Muneyuki: *See—*
Kawagoshi, Sakae; and Kubo, Muneyuki, 3,978,005.

Kuch, Wolfgang: *See—*
Berger, Rolf; Kuch, Wolfgang; and Endriss, Hartmut, 3,977,895.

Kudamatsu, Akio: *See—*
Aya, Masahiro; Kudamatsu, Akio; Miyamoto, Masao; Fukazawa, Nobuo; and Osuga, Shigeki, 3,978,107.

Kuen, Ling Kwok, to Lee Loy Plastic Company. Bead curtains. 3,977,458, Cl. 160-332.000.

Kuintzle, Charles, Jr., to Avco Corporation. Air pump for use in dusty environment. 3,977,811, Cl. 415-121.00G.

Kulle, Klaus: *See—*
Boruschewitz, Manfred; and Kulle, Klaus, 3,978,279.

Kultzow, Robert J.; and Simmonds, Leonard B., to Westinghouse Electric Corporation. Coil end insulation for dynamoelectric machines. 3,978,359, Cl. 310-260.000.

Kumakawa, Shiro: *See—*
Yoshikawa, Hirofumi; Hamana, Isao; and Kumakawa, Shiro, 3,977,175.

Kumbatovic, Robert Anthony, to RCA Corporation. Switching circuit. 3,978,349, Cl. 307-255.000.

Kumiai Chemical Industry Co., Ltd.: *See—*
Tsuchiya, Shigeru; Suda, Yoshitaka; Chiyomaru, Isao; Kawada, Seigo; and Takita, Kiyoshi, 3,978,091.
Yoshinaga, Eiichi; Wakamori, Shigeki; Dowke, Gosaburo; and Takita, Kiyoshi, 3,978,228.

Kuna, Wayne: *See—*
Meyer, Burton C.; Schoenfield, Palmer J.; and Kuna, Wayne, 3,977,122.

Kunieda, Masaharu: *See—*
Matsudaira, Tadashi; Kunieda, Masaharu; Kimura, Takanori; and Nakano, Shinya, 3,977,140.

Kunststoff- und Kabelmaschinenbau GmbH & Co. K.G.: *See—*
Sendlinger, Guenther, 3,977,170.

Kuparinen, Lasse, to Koh-I-Noor Rapidograph, Inc. Tubular writing pen. 3,977,798, Cl. 401-258.000.

Kurano, Nobuhiro: *See—*
Sano, Ryuichi; Kurano, Nobuhiro; Iwai, Hiroshi; and Momiyama, Iwao, 3,977,888.

Kuraray Co., Ltd.: *See—*
Fujita, Yoshiji; Omura, Yoshiaki; Hishida, Takashi; and Itoi, Kazuo, 3,978,100.

Kurata, Fred: *See—*
Hinton, Robert A.; and Kurata, Fred, 3,977,203.

Kurland, Richard M.; and Fruktow, Gelb N., to TRW Inc. Tubular strain energy deployable linear element antenna with stitched wire conductors. 3,978,489, Cl. 343-874.000.

Kurz, Arthur W., Jr.; and Wilson, Harold R., to Donnelly Mirrors, Inc. Edge forming method for mirror case. 3,978,190, Cl. 264-242.000.

Kuwada, Yutaka; Natsugari, Hideaki; and Meguro, Kanji, to Takeda Chemical Industries, Ltd. Pyrimido[1,2-a][1,5]. 3,978,058, Cl. 260-256.40F.

Kyburz, Rolf; and Kitzing, Rainer, to Ciba-Geigy AG. Acylurea compounds. 3,977,881, Cl. 96-111.000.

Kyburz, Rolf: *See—*
Stauner, Thomas; and Kyburz, Rolf, 3,978,122.

Kyoritsu Dempa Co., Ltd.: *See—*
Tsuruta, Sueichi; Nishiguchi, Hiroharu; Takigawa, Takamura; Hikawa, Shiro; and Kitasumi, Kazunori, 3,978,480.

L. & C. Steinmuller GmbH: *See—*
Kall, Horst, 3,977,977.

L. R. Nelson Corporation: *See—*
Bruninga, Kenneth J., 3,977,063.

Lachner, Otto: *See—*
Beyerlein, Ludwig; Geibel, Jurgen; Lachner, Otto; and Langer, Manfred, 3,977,820.

Lafevers, Jim O.: *See—*
Sanner, Medford Duane; Lafevers, Jim O.; and Mirci, Sauas, 3,978,450.

Laing, Nikolaus. Mechanically driven compressor for air conditioning devices, particularly in vehicles. 3,977,816, Cl. 417-355.000.

Lajcak, Stephan. Sash lock for closures. 3,977,711, Cl. 292-202.000.

Lakshmanan, Pallavoor R., to Gulf Research & Development Company. Adhesive composition. 3,978,013, Cl. 260-27.0BB.

Lambert, Cecil A.: *See—*
Prouty, Robert E.; and Lambert, Cecil A., 3,978,440.

Lambert, Paul, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM). Sealing arrangement. 3,977,439, Cl. 138-37.000.

Lamborn, Calvin R., to Gallatin Valley Seed Co. Mechanical removal of flat pod rogues from snap bean seed. 3,977,525, Cl. 209-75.000.

Lambright, Arthur James: *See—*
Coran, Aubert Yaucher; and Lambright, Arthur James, 3,977,453.
Coran, Aubert Yaucher; and Lambright, Arthur James, 3,977,454.

Lamicq, Pierre J. E.: *See—*
Ernst, Adolphe O. G.; Lamicq, Pierre J. E.; and Peisino, Jean A., 3,977,273.

Lamparsky, Dietmar: *See—*
Kaiser, Roman; and Lamparsky, Dietmar, 3,978,089.

Landis Lund Limited: *See—*
Bottomley, Herbert Geoffrey, 3,977,129.

Lane, Clinton Fisher; and Myatt, Hal Leslie, to Aldrich-Boranes, Inc. Process for the preparation of carbinols. 3,978,140, Cl. 260-617.00C.

Lane, L. Jubin, to General Electric Company. Self-tuning filter. 3,978,420, Cl. 330-107.000.

Lane, Rodney: *See—*
Brown, Kenneth Raymond; Lane, Rodney; and Luff, Douglas Reginald, 3,977,328.

Langenbach, Jack E., to International Telephone and Telegraph Corporation. Electronic packaging assembly. 3,977,749, Cl. 339-75.00M.

Langer, Erich; Jahnke, Uwe; and Sommer, Friedrich, to U.S. Philips Corporation. Recording and playback apparatus for video tape editing. 3,978,521, Cl. 360-14.000.

Langer, Manfred: *See—*
Beyerlein, Ludwig; Geibel, Jurgen; Lachner, Otto; and Langer, Manfred, 3,977,820.

Langworthy, Harold F.; and Wolfe, Robert N., to Eastman Kodak Company. Projection screen and apparatus for the fabrication thereof. 3,977,766, Cl. 350-127.000.

Lanzet, Monroe: *See—*
Fotiu, Eustace; Lanzet, Monroe; and Russ, Julio, 3,978,207.

Lapinet, Eugene; Cehovic, Georges D.; and Posternak, Theodore Z., to Nelson Research & Development Company. Cosmetic use of cyclic AMP and phosphodiesterase inhibitors. 3,978,213, Cl. 424-180.000.

Laprade, Bernard R.; Laprade, Xavier J. P.; and Gele, Pierre J. Arrangement for correcting the proportions of air and fuel supplied to an internal combustion engine. 3,977,375, Cl. 123-119.00D.

Laprade, Xavier J. P.: *See—*
Laprade, Bernard R.; Laprade, Xavier J. P.; and Gele, Pierre J., 3,977,375.

Larner, Donald Alexander, to Fluid Devices Limited. Bi-stable valve apparatus. 3,977,436, Cl. 137-625.650.

Larson, Roger R., to Pharmaco, Inc. Protective safety cap for medicament vial. 3,977,555, Cl. 215-247.000.

Lattin, William Walter, to Motorola, Inc. Temperature compensated oscillator. 3,978,431, Cl. 331-108.00C.

Lauer, Richard E.; and Pieper, Louis W., to General Electric Company. Apparatus and method for developing wound coils for electromagnetic devices and for interdependently conditioning winding apparatus and coil placing apparatus. 3,977,444, Cl. 140-92.100.

Lautenschlaeger, Karl, to Karl Lautenschlager KG. Furniture hinge. 3,977,042, Cl. 16-130.000.

Lavallee, Robert G.: *See—*
Bober, Robert E.; and Lavallee, Robert G., 3,978,414.

LaValley, Richard A., to General Motors Corporation. Method and apparatus for indicating and adjusting toe-setting. 3,977,067, Cl. 29-407.000.

Lavine, Matt P. Board game apparatus involving criminal justice. 3,977,680, Cl. 273-134.00C.

Lawler, Joseph A., to Blue M Electric Company. Temperature-controlled oven. 3,977,387, Cl. 126-21.00A.

Lawrence Peska Associates, Inc.: *See—*
Bankes, Frederick M., 3,978,447.
Gauslow, Leone K., 3,977,336.
Jackson, John Van, 3,977,278.
Schampier, Virginia, 3,977,450.

Lazenby, Terence Michael: *See—*
Alcock, Leslie; and Lazenby, Terence Michael, 3,977,834.

Leaf, Ronn J., to Dura Corporation. Tandem axle suspension. 3,977,700, Cl. 280-685.000.

Leasure, William C.: *See—*
Crossmore, Edward Y., Jr., 3,977,892.

Lebender, Rotraud: *See—*
Tuma, Rudolf; and Lebender, Rotraud, 3,978,099.

Le Boeuf, Albert R.; and Grovesteen, William R., to Warner-Lambert Company. Pyrrolidone-methacrylate graft copolymers from 3-stage polymerization process. 3,978,164, Cl. 260-885.000.

Lee, Chin-Ho: *See—*
Fedor, Robert J.; Lee, Chin-Ho; and Makowski, M. Paul, 3,978,193.

Lee Loy Plastic Company: *See—*
Kuen, Ling Kwok, 3,977,458.

Lee, Masayoshi: *See—*
Akaba, Hayao; Ikeda, Akira; Michihiro, Sho; and Lee, Masayoshi, 3,978,386.

Lee, Winston F. Z.; Hrivnak, James A.; and Speer, John R., to Rockwell International Corporation. Permanent magnet electrical machines. 3,978,354, Cl. 310-60.00R.

Leersnijder, Carolus Pieter, to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie. Bar-code writer. 3,977,509, Cl. 197-1.00R.

Lefebvre, Gerard: *See—*
Gruffaz, Max; and Lefebvre, Gerard, 3,978,152.

Lege, Sabray J. Dressmaker's attachment. 3,977,047, Cl. 24-73.0AS.

Legnaioli, Luciano. Variable voltage devices. 3,978,395, Cl. 323-43.50R.

Legrand, Yves: *See—*
Migeon, Rene; and Legrand, Yves, 3,978,391.

Le Guen, Benoit: *See—*
d'Auria, Luigi; Le Guen, Benoit; and Spitz, Erich, 3,977,764.

Leifer, Noel Arthur; and Raymore, Jack Drake, to Bell Telephone Laboratories, Incorporated. Locking and drive mechanism for magnetic tape cartridge. 3,977,624, Cl. 242-198.000.

LeMere, Roger: *See—*
Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., 3,977,538.

Lenhart, Gerry Anne; and Lenhart, Lawrence Donald. Method and system for recording heart lead tracings on segments of an EKG data strip and for detaching and transferring the segments to a permanent file. 3,978,491, Cl. 346-1.000.

Lenhart, Lawrence Donald: *See—*
Lenhart, Gerry Anne; and Lenhart, Lawrence Donald, 3,978,491.

Lennox Industries Inc.: *See—*
Pfarrer, David M.; and Parker, Sidney A., 3,978,382.

Leonard, Verna M. Left hand chord locator. 3,977,293, Cl. 84-474.000.

Leonische Drahtwerke AG: *See—*
Sendlinger, Guenther, 3,977,170.

Le Roy, Pierre: *See—*
Bouchaudon, Jean; Le Roy, Pierre; and Messer, Mayer Naoum, 3,978,078.

Les Condensateurs Sic-Safco: *See—*
Constanti, Jean, 3,978,377.

Lesk, Arnold, to Motorola, Inc. Silicon manufacture. 3,977,934, Cl. 156-608.000.

Leslie, Norman; and Otsap, Ben A. Dental instrument. 3,977,083, Cl. 32-58.000.

Lestrat, Michel R.: *See—*
Dumbaugh, William H., Jr.; Genisson, Roger R.; and Lestrat, Michel R., 3,978,362.

Leuthy, Henry R., Jr. Paddle game apparatus. 3,977,675, Cl. 273-85.00D.

Lever, Al. Photographic processing tank. 3,978,505, Cl. 354-307.000.

Lever Brothers Company: *See—*
Beyerlein, Ludwig; Geibel, Jurgen; Lachner, Otto; and Langer, Manfred, 3,977,820.
Freytag, Wolfram Gustav; Ney, Karl Heinz; and Wirotama, I. Poetoe Gde, 3,978,242.
Newman, Peter John; and Watson, Charles Andrew, 3,978,205.
van der Heijden, Arnoldus; and Schutte, Leonard, 3,978,240.

Leverenz, Klaus: *See—*
Gottschlich, Alois; Leverenz, Klaus; and Moritz, Karl-Ludwig, 3,978,040.

Levy, Stephen David: *See—*
Schrider, Michael Stanley; and Levy, Stephen David, 3,978,168.

Lewis, Bernard L.; and Hansen, James P., to United States of America, Navy. Stable base band adaptive loop. 3,978,483, Cl. 343-100.0LE.

Lewis, Delbert S.; Norton, David A.; Person, Robert P.; Schairer, George S.; and Wimpress, John K., to Boeing Company, The. STOL aircraft. 3,977,630, Cl. 244-43.0DB.

Lewis, J. Stephen: *See—*
Favilli, Riccardo Aldo; Lewis, J. Stephen; and Ratcliffe, Alfonso Fred, 3,977,292.

Lewis, Kenneth. Pool filter pressure gauge. 3,977,253, Cl. 73-401.000.

Lewis, Theras Gordon: *See—*
Hill, Donald Gifford; Lewis, Theras Gordon; and Vachon, Patrick Alban, 3,978,292.

Lewoczko, Elwin J., to Bird Machine Company, Inc. Hard-surfaced screw conveyor for centrifuges. 3,977,515, Cl. 198-213.000.

Lewthwaite, Herbert H. Apparatus for punching holes. 3,977,281, Cl. 83-138.000.

Liberti, Frank Nunzio, to General Electric Company. Thermally stable polycarbonate. 3,978,020, Cl. 260-45.80A.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Morz, Gunter; and Tokouzbalidis, Stilianos, 3,978,434.

Liedholz, Gerhard A., to Coulter Electronics, Inc. Universal cell holder. 3,977,794, Cl. 356-244.000.

Limburg, William W., to Xerox Corporation. Photoconductive compositions and imaging members and methods employing same. 3,978,029, Cl. 526-260.000.

Limiero, Albert David; and Lipien, Edwin Walter, to Western Electric Company; and Bell Telephone Laboratories, Incorporated. Return answer-supervisory circuit. 3,978,294, Cl. 179-27.0CA.

Limjuco, Guadalupe A.; and Carlo, Dennis J., to Merck & Co., Inc. Endotoxin free meningococcus polysaccharides. 3,978,209, Cl. 424-92.000.

Limper, Nicolaas Hendrik, to U.S. Philips Corporation. Television camera tube. 3,978,365, Cl. 313-372.000.

Lindeberg, Per-Gustav: *See—*
Natvig, Birger Johannes; Sandnaes, Per Christian; Lindeberg, Per-Gustav; and Salvesen, Olaf, 3,977,346.

Lindmayer, Joseph: *See—*
Revesz, Akos G.; and Lindmayer, Joseph, 3,977,905.

Lindner, Hannes: *See—*
Pirker, Robert; and Lindner, Hannes, 3,977,635.

Lindstrom, Jan Nils; and Ohlsson, Fall Johan Olof William, to Sandvik Aktiebolag. Cutting insert and method of making the same. 3,977,061, Cl. 29-95.00R.

Linker, Elliot C., to Electronic Engineering Company of California. Cooled roller. 3,977,590, Cl. 226-190.000.

Linley, Francis M., Jr., to Universal Thread Grinding Company. Anti-backlash, self-aligning nut. 3,977,269, Cl. 74-441.000.

Linsinger, Ernst. Machine for trimming and edge-profiling plate-like workpieces. 3,977,298, Cl. 90-11.00R.

Lipien, Edwin Walter: *See—*
Limiero, Albert David; and Lipien, Edwin Walter, 3,978,294.

Lipkin, Adolf Evgenievich: *See—*
Buchin, Petr Ivanovich; Lipkin, Adolf Evgenievich; Rudzit, Ernest Alexandrovich; Zenin, Boris Alexeevich; Viderker, Maxim

Georgievich; Smirnov, Viktor Alexandrovich; Balmasova, Irina Petrovna; Orlov, Evgeny Vladimirovich; and Chichkova, Larisa Alexandrovna, 3,978,082.

Lipkins, Morton S. Hollow retroreflector mount. 3,977,765, Cl. 350-102.000.

Litho-Paint Poster Company: *See—*
Berry, Thomas L., Jr.; and Mock, Kyle E., 3,977,109.

Litton Systems, Inc.: *See—*
Yerkovich, Simon; and Parrillo, Nicholas Vivian, 3,977,108.

Litz, Lawrence Marvin: *See—*
Trulson, Olof Conrad; and Litz, Lawrence Marvin, 3,977,967.

Livigni, Russell A.: *See—*
Nielsen, Stuart D.; Hargis, Ivan G.; and Livigni, Russell A., 3,978,161.

Lloyd, John B. Snowmobile loading apparatus. 3,977,545, Cl. 214-85.000.

Lochlear, Raymond L., Jr.: *See—*
Fulmer, Ray M.; and Lochlear, Raymond L., Jr., 3,977,854.

Lock, Peter Maurice, to Ionics Lyo Products Company. Surgical dressings. 3,978,266, Cl. 428-315.000.

Loewenberg, Gustav: *See—*
Gaiser, Dieter; Loewenberg, Gustav; Fitterer, Horst; and Woweries, Uwe, 3,977,626.

Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory, to Bell Telephone Laboratories, Incorporated. Heterostructure devices including tapered optical couplers. 3,978,426, Cl. 331-94.50H.

Lohbauer, Kenneth R.: *See—*
Kroth, Neil W.; Lohbauer, Kenneth R.; and Scheidt, James E., 3,977,301.

Lombardi, Michael, to Kreeger, Jerome, a part interest. Lid for food container. 3,977,559, Cl. 220-90.400.

Lombardi, Victor J.; and Dalmau, Jose Ma, to Jumberca, S.A., a part interest. Knitting machines and methods for knitting fabrics having terry loops on both sides thereof. 3,977,216, Cl. 66-111.000.

Lombardo, Anthony. Portable cooler for wine and other liquids. 3,977,552, Cl. 215-13.00R.

Lombardo, Michael S.; Jacovich, Elaine F.; D'Ottavio, Eugene D.; and Grunwald, John J., to MacDermid Incorporated. Method of improving the adhesion between a molded resin substrate and a metal film deposited thereon. 3,978,252, Cl. 427-299.000.

Longwood Machine Works, Incorporated: *See—*
Gallant, Donald A., 3,977,609.

Lopez-Cacicedo, Carlos, to Electricity Council, The. Electrolytic cells and process for treating dilute waste solutions. 3,977,951, Cl. 204-149.000.

L'Oreal: *See—*
Charle, Roger; Zviak, Charles; and Kalopissis, Gregoire, 3,978,204.
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 3,977,825.
Kalopissis, Gregoire; Bugaut, Andree; and Zorayan, Vahan, 3,978,061.

Lorenz, Edwin A.; and Schlanzky, Manfred P. H., to General Motors Corporation. Low tire pressure warning system with mechanical latching. 3,977,355, Cl. 116-34.00R.

Lorin, Guy: *See—*
Smadja, Dora; Decker, Marie-Therese; Derouet, Francoise; and Lorin, Guy, 3,977,912.

Lothman, Stig: *See—*
Martensson, Kjell; and Lothman, Stig, 3,977,591.

Louderback, Allan L.; and Fontana, Anthony J., to Baxter Laboratories, Inc. Calibrating fluid for blood cell counting and hemoglobin determination. 3,977,995, Cl. 252-408.000.

Louw, Wynand Jakobus, to University Patents, Inc. Low frequency electro-thermal filter. 3,978,418, Cl. 330-23.000.

Lovejoy, Curtis N.: *See—*
Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., 3,977,957.

Lovejoy, Walter R., to Beatrice Foods Co. Apparatus for making a partitioned container. 3,977,821, Cl. 425-249.000.

Lovejoy, Walter R., to Beatrice Foods Co. Method for making a partitioned container. 3,978,186, Cl. 264-102.000.

Lowery, J. Orbie: *See—*
Baston, Irv; Lowery, J. Orbie; and Thomas, O. Leon, 3,977,277.

Loza, Richard. Wrecking and hauling truck. 3,977,546, Cl. 214-86.00A.

Luce, Calvin R.: *See—*
Chozianin, Chris; Luce, Calvin R.; and Zukerman, Harold W., 3,978,246.

Lucerne Products, Inc.: *See—*
Sahrbacker, Edward V., 3,977,751.

Ludlow Corporation: *See—*
Keck, Jerry L.; and Rowley, James Robert, 3,977,310.

Luehrs, Dean C., to Michigan Technological University, Board of Control. Thermally activated electrochemical cell including an alkali metal salt solvate electrolyte. 3,977,900, Cl. 136-83.00T.

Luff, Douglas Reginald: *See—*
Brown, Kenneth Raymond; Lane, Rodney; and Luff, Douglas Reginald, 3,977,328.

Lugosi, Gyorgy: *See—*
Szoke, Sandor; Lugosi, Gyorgy; Csermely, Gyorgy; Bakonyi, Maria; Zsolnai, Tibor; and Szepessy, Istvan, 3,978,217.

Luitz, Max: *See—*
Kohler, Horst; Ess, Kurt; and Luitz, Max, 3,977,663.

Lum, Jack G. S., to Sound Technology, Inc. Distortion measurement system. 3,978,401, Cl. 324-57.00N.

Lundberg, Sten, to SKF Industrial Trading and Development Company, B.V. Wheel bearing assembly. 3,977,741, Cl. 308-207.00R.

Luperti, Harry E.; and Kresan, Lawrence J., to Pitney-Bowes, Inc. Locking device. 3,977,222, Cl. 70-292.000.

Lupkas, Raymond R.; and Schubert, Keith E., to Pitney-Bowes, Inc. Electrically controlled postage meter. 3,977,320, Cl. 101-110.000.

Luporini, Aime: *See—*
Curchod, Albert; and Luporini, Aime, 3,978,313.

Luthra, Vinod K., to Mobil Oil Corporation. Method for extruding a polystyrene foam with variations in mass concentration across the sheet and thermoforming the sheet. 3,978,182, Cl. 264-51.000.

Luvison, Angelo; and Pirani, Giancarlo, to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA. Digital equalizer for data-transmission system. 3,978,435, Cl. 333-18.000.

Lyle, Don Martin: *See—*
Barton, Robert Stanley; Davis, Alan Lynn; Hauck, Erwin Arthur; Lyle, Don Martin; and Turner, Lloyd Drayton, 3,978,452.

Lynch, Charles R.; Copeland, Edward A.; and White, William D., to Texaco Inc. Means for determining the saybolt viscosity of a hydrocarbon stream for a desired temperature. 3,977,234, Cl. 73-53.000.

Lynch, James Edward; Parmer, Kenneth Ronald; and Cobaugh, Robert Franklin, to AMP Incorporated. Method of fabricating multi-layer printed circuit board. 3,977,075, Cl. 29-628.000.

Lynch, Thomas J., to Gulf Research & Development Company. Metal oxide aerogels. 3,977,993, Cl. 252-317.000.

Lynn, William J.; and Seeger, Richard E., Jr., to Chomerics, Inc. Keyboard switch assembly with improved pushbutton and associated double snap acting actuator/contactor structure. 3,978,297, Cl. 200-5.00A.

M.M. Sundt Construction Company: *See—*
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Maass, Richard L.: *See—*
Faust, Kenneth J.; and Maass, Richard L., 3,978,258.

Maattanen, Mauri, to Oy Yleinen Insinooritoimisto. Lighthouse or beacon construction. 3,977,200, Cl. 61-86.000.

Mabuchi, Kenichi, to Mabuchi Motor Co. Ltd. Cell holding device. 3,977,758, Cl. 339-224.000.

Mabuchi Motor Co. Ltd.: *See—*
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MacDermid Incorporated: *See—*
Lombardo, Michael S.; Jacovich, Elaine F.; D'Ottavio, Eugene D.; and Grunwald, John J., 3,978,252.

Machinefabriek Geurtsen Deventer, B.V.: *See—*
Geurtsen, Alfonsus Antonius, 3,977,975.

MacKenzie, Gerald L.: *See—*
McCulloch, Charles R.; and MacKenzie, Gerald L., 3,977,924.

MacKew, Allan H. Prosthetic catheter. 3,977,408, Cl. 128-349.00B.

MacPike, Kenneth A.; and Pence, Paul E. Long travel rear wheel suspension system for motorcycle. 3,977,697, Cl. 280-284.000.

Macquire-Cooper, Richard Terence. Pressurized containers and method of making. 3,977,575, Cl. 222-396.000.

Madison Materials Co.: *See—*
Moon, John C.; and Brown, Tom C., 3,977,646.

Maeshima, Kaoru: *See—*
Hanma, Noritaka; Fukumura, Masataka; Maeshima, Kaoru; and Nakagome, Takenari, 3,978,053.

Magee, Hubert E., Jr., to Partek Corporation of Houston. Fluid delivery system. 3,977,603, Cl. 239-76.000.

Mages, Bernhard: *See—*
Rock, Erich; and Mages, Bernhard, 3,977,041.

Magiera, David L., to Wicks & Nemer, P.A. Board game apparatus. 3,977,677, Cl. 273-134.00D.

Magiera, David L., to Wicks & Nemer, P.A. Board game apparatus. 3,977,679, Cl. 273-134.00D.

Magne, Robert, to Rhone-Poulenc S.A. Liquid methyl vinylphenylpolysiloxane resins. 3,978,025, Cl. 260-46.5UA.

Mahnken, L. Wesley. Multi-purpose hobby finishing apparatus. 3,977,127, Cl. 51-5.00R.

Mai, Horst, to Maschinenfabrik Augsburg-Nuremberg AG. Rotary storage heat exchanger structure. 3,977,464, Cl. 165-9.000.

Maichuk, Jury Fedorovich: *See—*
Khromov, Gennady Lvovich; Davydov, Anatoly Borisovich; Maichuk, Jury Fedorovich; and Tishina, Inna Fedorovna, 3,978,201.

Maiorov, Alexei Ivanovich: *See—*
Kraizinger, Fedor Vladimirovich; Zinsky, Alexei Ilich; Getman, Boris Fedorovich; Bruk, Alexandr Semenovich; Eremenko, Sergei Sergeevich; Maiorov, Alexei Ivanovich; and Reshetov, Vladimir Ivanovich, 3,977,659.

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Shibata, Kazuo; and Kasai, Seiji, 3,977,442.
Nisshin Kogyo Kabushiki Kaisha: *See—*
Kasahara, Hiroshi, 3,977,731.
NL Industries, Inc.: *See—*
White, Robert Winslow; and Franco, Armando, 3,977,894.
Nobel Scientific Industries, Inc.: *See—*
White, Timothy P., 3,977,445.
Noble, Charles H. Method of cold extruding ductile cast iron tube. 3,977,227, Cl. 72-367.000.
Noe, Terry Wayne, to Texas Instruments Incorporated. Lead frame assembly for a packaged semiconductor microcircuit. 3,978,516, Cl. 357-70.000.
Noker, Alvin John, to Sperry Rand Corporation. Stylus assembly. 3,978,494, Cl. 346-139.00C.
Nomura, Yasuo: *See—*
Tanaka, Takashi; and Nomura, Yasuo, 3,978,523.
Nordberg, Carl-Eric Bertil. Turnable truck gate. 3,977,718, Cl. 296-57.00R.
Nordstrom, Karl Tage, to Allmanna Svenska Elektriska Aktiebolaget. Roll stabilization system. 3,977,694, Cl. 280-112.00A.
North American Development Company: *See—*
Worthing, Robert W., 3,977,345.
Northrop, Lyle M., to Winlite, Inc. Vehicle door prop assembly. 3,977,712, Cl. 292-338.000.
Northrup, Leonard L., Jr. Air conditioning module. 3,977,467, Cl. 165-65.000.
Norton, David A.: *See—*
Lewis, Delbert S.; Norton, David A.; Person, Robert P.; Schairer, George S.; and Wimpress, John K., 3,977,630.
Novello, Frederick C.: *See—*
Baldwin, John J.; and Novello, Frederick C., 3,978,054.
Novi Plastics Company: *See—*
Daniels, Phillip D., 3,977,136.
Nowicki, John V.; and Hakanson, John D., to Minnesota Mining and Manufacturing Company. Magnetic head cleaning tape and method. 3,978,520, Cl. 358-10.000.
Nuclear Battery Corporation: *See—*
Bustard, Thomas Stratton; and Goslee, David Earl, 3,977,813.
Nursery Implements, Inc.: *See—*
Stewart, John E., 3,977,099.
Oberhauser, Franz: *See—*
Wallner, Felix; Oberhauser, Franz; Mildner, Heinz; Rudelstorfer, Heinrich; Drexler, Berndt; and Klicnik, Franz, 3,977,914.
O'Brien, James W.: *See—*
Coleman, Steven J.; and O'Brien, James W., 3,977,407.

Occelli, Emilio; Fontanella, Luigi; and Nathansohn, Giangiacomo, to Gruppo Lepetit S.p.A. Reserpine derivatives. 3,978,065, Cl. 260-287.00A.

Occidental Petroleum Corporation: *See*—
Chemtob, Elie M.; and Marcote, Roland V., 3,977,835.

Odagiri, Saburo; and Hirano, Jiro, to Kabushiki Kaisha Tomoku. Process and apparatus for producing a soft fibrous sheet. 3,977,928, Cl. 156-62.200.

Odegard, Knut Hilmar; and Krogstad, Ivar, to A/S Pusnes Mekaniske Verksted. Linking members for connecting a rope and a chain. 3,977,181, Cl. 59-93.000.

Odland, Karsten, to Nalco Chemical Company. Ion exchange regeneration. 3,977,968, Cl. 210-32.000.

Oelmann, Alfred; Engel, Claus Richard; and Rothbuhr, Lothar, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for production of deep colored small particle size gas black with low content of extractable matter. 3,978,019, Cl. 260-42.200.

Ogawa, Hiroshi: *See*—
Yamada, Hirozi; Ogawa, Hiroshi; Aono, Satoru; and Hirano, Hironori, 3,977,243.

Ogawa, Kiyoshi: *See*—
Nakanishi, Michio; Muro, Tomio; Nakao, Tohru; and Ogawa, Kiyoshi, 3,978,071.

Ogawa, Takuzo; Yatsuo, Tsutomu; and Morita, Keiichi, to Hitachi, Ltd. Diode-integrated high speed thyristor. 3,978,514, Cl. 357-39.000.

Ogawa, Yutaka, to Akebono Brake Industry Co., Ltd. Disc brake caliper mounting. 3,977,498, Cl. 188-73.300.

Oger, Jacques, to Pont-A-Mousson S.A. Man-hole assembly. 3,977,124, Cl. 49-463.000.

Ogino, Yoshio: *See*—
Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, 3,978,307.

Ohara, Isao. Apparatus for producing a die cast of a complicated shape. 3,977,462, Cl. 164-256.000.

Ohashi, Takashi: *See*—
Yukuta, Toshio; Moki, Takao; Ohashi, Takashi; Iwami, Kouichi; and Suzuki, Akira, 3,978,154.

Ohhama, Yasumichi: *See*—
Atsumi, Minoru; Nakano, Yoshikatsu; and Ohhama, Yasumichi, 3,977,380.

Ohkubo, Kazuo: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Tamao, Yoshikuni; Tonomura, Shinji; and Ohkubo, Kazuo, 3,978,045.

Ohloff, Gunther: *See*—
Schulte-Elte, Karl-Heinrich; Joyeux, Michel; and Ohloff, Gunther, 3,978,008.

Ohlsson, Fall Johan Olof William: *See*—
Lindstrom, Jan Nils; and Ohlsson, Fall Johan Olof William, 3,977,061.

Ohms, Edward J., to Caterpillar Tractor Co. Auger control system for a scraper. 3,977,101, Cl. 37-8.000.

Ohms, Edward J., to Caterpillar Tractor Co. Load ejection improvement for auger scrapers. 3,977,102, Cl. 37-8.000.

Ohorodnik, Alexander; Dettmeier, Udo; Gehrmann, Klaus; and Berns, Heinz-Josef, to Hoechst Aktiengesellschaft. Production of 2-chlorobutadiene-1,3. 3,978,146, Cl. 260-655.000.

Ohtsuka, Tetsuro: *See*—
Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, 3,977,769.

Oishi, Yasushi, to Fuji Photo Film Co., Ltd. Film unit comprising an image receiving element and light intercepting element attached together along at least one edge thereof. 3,977,877, Cl. 96-76.00C.

Okabayashi, Takashi; and Mikuni, Satoru, to Sybron Corporation. Liquid agitator with vibration suppressing stabilizers. 3,977,655, Cl. 259-107.000.

Okada, Ichiro. Tubular needle-driving device of a fabric-marking apparatus. 3,977,316, Cl. 101-26.000.

Okada, Masao, to Eisai Co., Ltd. Deodorizing compositions. 3,978,208, Cl. 424-76.000.

Okada, Ryuzo: *See*—
Nagashima, Toshio; Nakaguchi, Mitsuharu; Tsukamoto, Takuzo; Okada, Ryuzo; Kito, Hidetoshi; and Handa, Kenichi, 3,977,361.

Okada, Senri: *See*—
Nakae, Hideo; Kiyosuke, Hitoshi; and Okada, Senri, 3,977,868.

Okada, Toshiaki: *See*—
Imaizumi, Ichiro; Tomura, Teruichi; Akatsuka, Mitsuo; Katsueda, Mineo; Okada, Toshiaki; and Iyama, Hiroyuki, 3,978,369.

Okamoto, Shosuke; Kikumoto, Ryoji; Tamao, Yoshikuni; Tonomura, Shinji; and Ohkubo, Kazuo, to Mitsubishi Chemical Industries Ltd. $N^3$-dansyl-L-arginine derivatives, and the pharmaceutically acceptable acid addition salts thereof. 3,978,045, Cl. 260-239.00B.

Okamoto, Yusho: *See*—
Kamisaka, Makoto; Kojima, Kanji; Negoro, Tatsuya; Uchikubo, Toshichika; Okamoto, Yusho; Minato, Sadao; and Shibata, Toshio, 3,977,154.

Okaniwa, Tetuo: *See*—
Konishi, Seizo; Ishii, Koichi; Abeta, Sadaharu; and Okaniwa, Tetuo, 3,977,827.

Okuma, Yoshihisa; Toida, Takashi; and Tsunoda, Ichiro, to Dai Nippon Insatsu Kabushiki Kaisha. Electro-optical cell. 3,977,767, Cl. 350-160.0LC.

Okumura, Kadode: *See*—
Asaba, Shuji; Sato, Takeo; and Okumura, Kadode, 3,977,783.

Okuno, Youichi; and Yokota, Hideo, to Canon Kabushiki Kaisha. View-finder device for single lens reflex camera. 3,978,502, Cl. 354-225.000.

Oldfather, Charles L.: *See*—
Willis, Roderick M.; and Oldfather, Charles L., 3,977,970.

Olin, Paul H.; and Mathison, Allen D., to Toro Company, The. Mower-height-of-cut adjustment mechanism. 3,977,163, Cl. 56-7.000.

Oliphant, Kenward S., to CRS Industries, Inc. Electrostatic precipitator and gas sensor control. 3,977,848, Cl. 55-105.000.

Oliver, John P., to Cameron Iron Works, Inc. Ball joint. 3,977,707, Cl. 285-265.000.

Ollinger, Max: *See*—
Gupta, Jutta Das; Markwitz, Wernhard; and Ollinger, Max, 3,978,408.

Olson, Dag; and Berggren, Jarl Erik, to AB Centralsug. Outdoors refuse-receiving system. 3,977,729, Cl. 302-27.000.

Omi, Kyoji: *See*—
Suzuki, Shigeru; Omi, Kyoji; and Tani, Tatsuo, formerly Nishikawa, 3,977,666.

Omura, Yoshiaki: *See*—
Fujita, Yoshiji; Omura, Yoshiaki; Hishida, Takashi; and Itoi, Kazuo, 3,978,100.

Ondetti, Miguel A.: *See*—
Sheehan, John T.; and Ondetti, Miguel A., 3,978,034.

Ondrasik, Vladimir J., II. Rack constraining apparatus. 3,977,389, Cl. 126-337.00R.

One Michigan Avenue Corporation: *See*—
Vieira, Manuel; Vieira, Michael M.; Vieira, Manuel, Jr.; and Vieira, Robert M., 3,977,076.

O'Neal, Cothburn M.; Mayo, Alfred M.; and Childs, George William, deceased (by Childs, Patricia M., executrix), to Riverside Press, Inc. Voting machine. 3,977,357, Cl. 116-124.00R.

Ono, Hiroshi: *See*—
Kawamura, Yuji; and Ono, Hiroshi, 3,977,861.

Ono Pharmaceutical Co., Ltd.: *See*—
Matsumoto, Kimiichiro; Fujita, Tsuneo; Sakai, Toshitaka; and Tsuda, Takeshi, 3,978,229.

Ono, Shinji: *See*—
Tan, Yoichi; and Ono, Shinji, 3,978,285.

Onoe, Morio. Oscillator having plural piezoelectric vibrators parallel connected for temperature compensation. 3,978,432, Cl. 331-162.000.

Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for converting styrene or polystyrene to nitrobenzoic acids. 3,978,118, Cl. 260-523.00R.

Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for converting stilbene or bibenzyl to nitrobenzoic acids. 3,978,119, Cl. 260-523.00R.

Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for preparing diaryldinitroethylenes. 3,978,143, Cl. 260-645.000.

Onopchenko, Anatoli: *See*—
Bacha, John D.; Onopchenko, Anatoli; and Schulz, Johann G. D., 3,978,117.

Onyshkevych, Lubomyr Stephen: *See*—
Alig, Roger Casanova; and Onyshkevych, Lubomyr Stephen, 3,978,436.

Oomens, Johannes M. M.: *See*—
Spaan, Josef A. E.; Veenstra, Pieter C.; and Oomens, Johannes M. M., 3,977,976.

Orion Tool Co., Ltd.: *See*—
Osumi, Nobuyuki, 3,977,276.

Orlov, Evgeny Vladimirovich: *See*—
Buchin, Petr Ivanovich; Lipkin, Adolf Evgenievich; Rudzit, Ernest Alexandrovich; Zenin, Boris Alexeevich; Viderker, Maxim Georgievich; Smirnov, Viktor Alexandrovich; Balmasova, Irina Petrovna; Orlov, Evgeny Vladimirovich; and Chichkova, Larisa Alexandrovna, 3,978,082.

Orobitg, Juan-Ramon Moreu, to Jumberca, S.A. Needle selector mechanism for knitting machine. 3,977,215, Cl. 66-50.00R.

Orozco, Hector Mendoza. Submachine gun with removable gun bolt guide. 3,977,297, Cl. 89-199.000.

Orr, Howard S.: *See*—
Vierling, Donald E.; and Orr, Howard S., 3,977,365.

Orschler Produktion KG: *See*—
Berger, Volker Ernst Uwe, 3,977,528.

Osborn-Mushet Tools Limited: *See*—
Siddall, Keith, 3,977,807.

Oshima, Akira; Abe, Kazunori; and Kameda, Nobuo, to Mitsubishi Rayon Co., Ltd. Process for producing abrasion-resistant cast article. 3,978,178, Cl. 264-25.000.

Ostermayer, Franz: *See*—
Jaeggi, Knut A.; Schroter, Herbert; and Ostermayer, Franz, 3,978,041.

Ostrowsky, Daniel; Jacques, Andre; and Papuchon, Michel, to Thomson-CSF. Coupling device for an optical waveguide and a method for manufacturing such a device. 3,977,763, Cl. 350-96.00C.

Osuga, Shigeki: *See*—
Aya, Masahiro; Kudamatsu, Akio; Miyamoto, Masao; Fukazawa, Nobuo; and Osuga, Shigeki, 3,978,107.

O'Sullivan, Bernard. Vehicle rear view mirror with slidable parallel sections. 3,977,774, Cl. 350-304.000.

Osumi, Nobuyuki, to Orion Tool Co., Ltd. Method for producing a forming tool having a sintered web-like cutting edge. 3,977,276, Cl. 76-104.00R.

Othmer, Donald F. Method for producing titanium. 3,977,866, Cl. 75-84.500.

Otsap, Ben A.: *See—*
Leslie, Norman; and Otsap, Ben A., 3,977,083.

Outboard Marine Corporation: *See—*
Kroll, Raymond A., 3,977,356.

Ovard, John C.; and Reisman, Joel I., to Ecodyne Corporation. Flow control apparatus. 3,977,431, Cl. 137-588.000.

Overseas Containers Limited: *See—*
Heighton, Arthur Victor, 3,977,208.

Owen, Robert G. Method for extracting metals from ore. 3,977,865, Cl. 75-11.000.

Owens-Corning Fiberglas Corporation: *See—*
Fulmer, Ray M.; and Lochlear, Raymond L., Jr., 3,977,854.

Owens-Illinois, Inc.: *See—*
Dybala, Ambrose B.; Krall, Thomas J.; and Uhlig, Albert R., 3,978,184.

Owens, Malcolm P.; and Barnes, Edgar E., to Fiber Industries, Inc. Yarn winding apparatus. 3,977,615, Cl. 242-41.000.

Owens, Malcolm P.; and Barnes, Edgar E., to Fiber Industries, Inc. Yarn winding apparatus. 3,977,616, Cl. 242-46.400.

Oxy Metal Industries Corporation: *See—*
Quayle, Bruce R., 3,978,394.
Smadja, Dora; Decker, Marie-Therese; Derouet, Francoise; and Lorin, Guy, 3,977,912.

Oy Yleinen Insinooritoimisto: *See—*
Maattanen, Mauri, 3,977,200.

Pabodie, Robert M., to Monarch Marking Systems, Inc. Printing band. 3,977,321, Cl. 101-111.000.

Pagani, Fiorino: *See—*
Zambelli, Celestino; and Pagani, Fiorino, 3,977,081.

Pagani, Hermes: *See—*
Coronelli, Carolina; Parenti, Francesco; White, Richard; and Pagani, Hermes, 3,978,211.

Page, John S., Jr. Well tubing anchor with automatic delay and method of installation in a well. 3,977,473, Cl. 166-315.000.

Pagenkemper, Peter: *See—*
Sobottka, Gert; Pagenkemper, Peter; Eisenburger, Heinrich; and Schoof, Werner, 3,978,441.

Paige, Edward George Sydney, to British Secretary of State for Defence. Surface acoustic wave devices. 3,978,437, Cl. 333-72.000.

Paladino, Albert E.; and Weihrauch, Paul F., to Raytheon Company. Method of making magnets. 3,977,918, Cl. 148-31.570.

Palisin, Stephen P., Jr., to Empire Plating Company, The. Coated metal article and method of coating. 3,977,839, Cl. 29-195.000.

Pallos, Ferenc M.; and DeBaun, Jack R., to Stauffer Chemical Company. o-Chlorobenzamidoxime as an anti-inflammatory agent. 3,978,202, Cl. 424-327.000.

Pallos, Ferenc M.; and DeBaun, Jack R., to Stauffer Chemical Company. Nicotinamidoxime as an anti-inflammatory agent. 3,978,219, Cl. 424-264.000.

Pallos, Ferenc M.: *See—*
DeBaun, Jack R.; Pallos, Ferenc M.; and Baker, Don R., 3,978,227.

Panneman, Harm Jan, to Akzona Incorporated. N-hydroxy-amidine compounds. 3,978,126, Cl. 260-564.00G.

Paparodis, Nicholas J., to Edward J. DeBartolo Corporation, The. Area lighting luminaire. 3,978,331, Cl. 240-25.000.

Papuchon, Michel: *See—*
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Parenti, Francesco: *See—*
Coronelli, Carolina; Parenti, Francesco; White, Richard; and Pagani, Hermes, 3,978,211.

Parish, Roger C.: *See—*
Baile, Clifton A.; Kingsbury, William D.; and Parish, Roger C., 3,978,221.

Parker, Richard Ghrist; and Kelley, Philip Carlos, to B. F. Goodrich Company, The. Color stabilized polyurethanes. 3,978,156, Cl. 260-859.00R.

Parker, Sidney A.: *See—*
Pfarrer, David M.; and Parker, Sidney A., 3,978,382.

Parmer, Kenneth Ronald: *See—*
Lynch, James Edward; Parmer, Kenneth Ronald; and Cobaugh, Robert Franklin, 3,977,075.

Parrillo, Nicholas Vivian: *See—*
Yerkovich, Simon; and Parrillo, Nicholas Vivian, 3,977,108.

Partek Corporation of Houston: *See—*
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Parvi, Ludovic: *See—*
Nagy, Georges; Balde, Daniel; Sobel, Lucien; and Parvi, Ludovic, 3,978,169.

Pastoriza, James J., to Analog Devices, Inc. Integrated-circuit digital-to-analog converter. 3,978,473, Cl. 340-347.0DA.

Patel, Bhupendra C., to Kendall Company, The. Catheter adapter. 3,977,403, Cl. 128-221.000.

Patelhold Patentverwertungs- und Elektro-Holding AG: *See—*
Bruckner, Markus; Guanella, Gustav; and Vouga, Claude Andre, 3,978,288.

Paterson, Peter J. Apparatus for delivering fluid to a utilization device and a closed loop system for cleaning said apparatus and said utilization device. 3,977,797, Cl. 401-15.000.

Patry, Francis Joseph, to Johns-Manville Corporation. Roof vent support arrangement. 3,977,137, Cl. 52-60.000.

Patsch, Manfred: *See—*
Eilingsfeld, Heinz; and Patsch, Manfred, 3,978,096.
Eilingsfeld, Heinz; and Patsch, Manfred, 3,978,144.

Patton, Jon R., to Clark Equipment Company. Differential pressure regulator valve for a hydrostatic transmission control system. 3,977,424, Cl. 137-106.000.

Pauling, Horst: *See—*
Wilke, Gunther; Bogdanovic, Borislav; and Pauling, Horst, 3,978,147.

Paulson, Donald C.: *See—*
Groleau, Rodney J.; and Paulson, Donald C., 3,977,255.

Pawellek, Dieter; Bielendorfer, Edmund; and Wedemeyer, Karlfried, to Bayer Aktiengesellschaft. Process for preparing 4-amino-diphenylamine. 3,978,131, Cl. 260-576.000.

Pease, Lionel. Harvester chipper machine. 3,977,447, Cl. 144-172.000.

Pech, David J.: *See—*
Helm, Percy R.; Morrow, James G., Sr.; and Pech, David J., 3,977,530.

Pecoraro, John F. Body harness for the protective retention of an extension cord. 3,977,584, Cl. 224-5.00H.

Pedersen, Jens Kristian, to Kobenhavns Pektinfabrik. Process for preparing gelled sour milk. 3,978,243, Cl. 426-573.000.

Peer, Charles D., to Great Plains Industries, Inc. Evaporator cooler apparatus. 3,978,174, Cl. 261-29.000.

Peille, Jean-Marie, to Societe de Participations Etudes et Realisations (SPER). Method and machine for the continuous manufacture of panels. 3,977,931, Cl. 156-78.000.

Peisino, Jean A.: *See—*
Ernst, Adolphe O. G.; Lamicq, Pierre J. E.; and Peisino, Jean A., 3,977,273.

Pelly AB: *See—*
Nilsson, Alvar Erling, 3,977,558.

Pelton, John Franklin, to Union Carbide Corporation. Suspended sludge scraper for arcuate sedimentation zone. 3,977,974, Cl. 210-195.00S.

Pence, Paul E.: *See—*
MacPike, Kenneth A.; and Pence, Paul E., 3,977,697.

Perazzoni, Pierluigi: *See—*
Siclari, Francesco; Perazzoni, Pierluigi; and Silvestroni, Piergiorgio, 3,978,098.

Perez, Abel Macias, to Monarch Marking Systems, Inc. Fastener assembly. 3,977,050, Cl. 24-150.0FP.

Perronin, Jean; and Decamp, Rene Paul Auguste, to Produits Chimiques Ugine Kuhlmann. Pigmentary printing pastes for textiles. 3,978,016, Cl. 260-29.6TA.

Perry, Walter Merton. Container with attached closure. 3,977,578, Cl. 222-541.000.

Person, Robert P.: *See—*
Lewis, Delbert S.; Norton, David A.; Person, Robert P.; Schairer, George S.; and Wimpress, John K., 3,977,630.

Perztsch, Albert; Riedel, Anton; Wilke, Werner; and Mehltretter, Michael, to AGFA-Gevaert, A.G. Cutting tool for longitudinally cutting continuous sheets of film. 3,977,285, Cl. 83-501.000.

Peters, Robert M., to Aluminum Company of America. Metal shake or shingle panel and accessories. 3,977,141, Cl. 52-313.000.

Petersen, Bjarne Louis: *See—*
Ronnhult, John Fritiof; Estmar, Ernst Goran; and Petersen, Bjarne Louis, 3,977,734.

Peterson, Carl R.: *See—*
Fisk, Allan T.; and Peterson, Carl R., 3,977,481.

Peterson, Walter F., to Gold Medal, Inc. Replaceable flexible back panel for folding chairs. 3,977,721, Cl. 297-45.000.

Petit, Albert Alfred Paul, to A. Petit & Co. S.A.R.L. Controlled discharge pressure pump for pumping liquids. 3,977,809, Cl. 415-29.000.

Petree, Marcella C., to United States of America, Navy. Damage thresholds of p-n junction devices by a current pulse method. 3,978,405, Cl. 324-158.00T.

Pettit, Dorn L., to Square D Company. Ground fault detector with a nonlinear sensing means. 3,978,400, Cl. 324-51.000.

Pfarrer, David M.; and Parker, Sidney A., to Lennox Industries Inc. Control apparatus for two-speed, single phase compressor. 3,978,382, Cl. 318-221.00R.

Pfeiffer, Hans: *See—*
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Pfizer Inc.: *See—*
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Pharmaco, Inc.: *See—*
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Philip Morris Incorporated: *See—*
Hoelzel, Charles B.; Rainer, Norman B.; and Wilson, Peter Allen, 3,977,417.

Philipp, Adolf H.; Demerson, Christopher A.; and Humber, Leslie G., to Ayerst, McKenna and Harrison Ltd. Certain 4,6-dihydropyrrolo-triazoline-quinoline derivatives. 3,978,066, Cl. 260-288.0CF.

Phillippi, Larry R., to Samuel Moore and Company. Composite brake hose. 3,977,440, Cl. 138-125.000.

Phillips, Esther M. Break-away heel for shoes. 3,977,095, Cl. 36-42.000.

Phillips, John, to British Steel Corporation. Stillages. 3,977,333, Cl. 108-54.100.

Phillips Petroleum Company: *See—*
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Clayton, Hadwen A., 3,977,423.
DeFord, Donald D., 3,978,415.
Fernandez, Miguel A., 3,977,057.
Malick, Emil A., 3,977,946.

Stumpe, Nelson A., Jr.; and Railsback, Henry E., 3,978,165.
Pieper, Gustav: *See—*
Naumann, Gunther; Pieper, Gustav; and Rehberg, Hans-Joachim, 3,978,206.
Pieper, Louis W.: *See—*
Lauer, Richard E.; and Pieper, Louis W., 3,977,444.
Pier-Amory, Jacques; and Franci, Giosue, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Belt monitoring apparatus. 3,977,295, Cl. 89-137.000.
Pierce, Russell W.; and Rogers, Fred T., to United States of America, Navy. Segmented flow laser cavity. 3,978,430, Cl. 331-94.50D.
Pierer, Gerhard: *See—*
Edel, Bernhard; and Pierer, Gerhard, 3,977,755.
Pierson, Merlin A.: *See—*
Angwin, James H.; and Flannery, John B., 3,978,481.
Pike, William Floyd. Injection apparatus. 3,977,401, Cl. 128-218.00D.
Pike, William Floyd. Injection apparatus and method with automatic aspiration feature. 3,977,402, Cl. 128-218.00D.
Pikul, Guy L.: *See—*
Meade, Charles B.; Pikul, Guy L.; and Carberry, Thomas J., 3,977,588.
Pinke, Paul A.; and Massie, Stephen N., to Universal Oil Products Company. Fuel and lubricant compositions containing novel pyrrolidinyl or piperidinyl-substituted diphenyl alkane antioxidants. 3,977,987, Cl. 252-50.000.
Pioneer Electronic Corporation: *See—*
Kinoshita, Shouzo, 3,978,353.
Konno, Akira, 3,978,289.
Pirani, Giancarlo: *See—*
Luvison, Angelo; and Pirani, Giancarlo, 3,978,435.
Pirker, Robert; and Lindner, Hannes, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Railway switch for Vignoles rails. 3,977,635, Cl. 246-387.000.
Pitner, Alfred, to Nadella, a part interest. Rectillinear guide device. 3,977,736, Cl. 308-6.00C.
Pitney-Bowes, Inc.: *See—*
Bologna, Vincent P.; and McEvoy, Joseph E., 3,977,668.
Check, Frank T., Jr.; Eckert, Alton B., Jr.; and Warren, Joseph R., 3,978,457.
Luperti, Harry E.; and Kresan, Lawrence J., 3,977,222.
Lupkas, Raymond R.; and Schubert, Keith E., 3,977,320.
Pitney, Lennord L., to United States of America, Army. Lap belt tightener. 3,977,724, Cl. 297-385.000.
Pittinger, Charles B., Jr. Grass cutting chain saw drive system. 3,977,078, Cl. 30-276.000.
Pitzken, Albrecht: *See—*
Badicke, Gerd; Dell, Hans-Dieter; and Pitzken, Albrecht, 3,978,220.
Pizzolato, Giacomo: *See—*
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Plattier, Marcel: *See—*
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Platz, Rolf: *See—*
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Plempel, Manfred: *See—*
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PMS Consolidated: *See—*
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Poffenberger, James C.; Corkran, William F.; Siter, Ralph B., Jr.; and Champa, Raymond J., to Preformed Line Products Company. Spacer-damper. 3,978,276, Cl. 174-42.000.
Pol, Kenneth J.; and Willis, William E., to General Motors Corporation. Continuous mechanical iron pouring line. 3,977,461, Cl. 164-155.000.
Polaroid Corporation: *See—*
Bagby, John P.; Ferrari, Leonard A.; Figge, Erwin E.; and Hapke, Kenyon A., 3,977,623.
Pollard, Edward T., to PMS Consolidated. Method of coloring and molding a shaped thermoplastic resin article. 3,978,036, Cl. 264-140.000.
Pollner, Rudolf: *See—*
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Polytop Corporation: *See—*
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Pont-A-Mousson S.A.: *See—*
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Poor, Robert G. Rifle magazine. 3,977,114, Cl. 42-50.000.
Pops, Horace: *See—*
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Pormale, Milda Yanovna: *See—*
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Porret, Daniel; and Habermeier, Jurgen, to Ciba-Geigy Corporation. Dialkoxyphosphonoalkyl derivatives of cyclic ureides. 3,978,076, Cl. 260-309.500.
Posselt, Manfred: *See—*
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Post Office, The: *See—*
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Pouillot, Michel Auguste Achille: *See—*
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Powder Couplings Limited: *See—*
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PPG Industries, Inc.: *See—*
Donley, Harold E., 3,978,272.
Greenberg, Charles B., 3,978,271.
Manner, James A., 3,978,032.
Pradt, Louis A.; and Meidl, John A., to Sterling Drug Inc. Purification of non-biodegradable industrial wastewaters. 3,977,966, Cl. 210-17.000.
Pran, Leif: *See—*
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Pran, Nils Beylegaard; Johnsrud, Bjorn; and Pran, Leif, to N.B. Pran. High sea vessel having tanning and cargo carrying capabilities. 3,977,352, Cl. 114-235.00R.
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Precision Screen Machines Inc.: *See—*
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Pressman, Gerald L.; Blake, David E.; and Frohbach, Hugh F., to ElectroPrint, Inc. Electrostatic printing system and method using ions and liquid aerosol toners. 3,977,323, Cl. 101-426.000.
Prestayko, Metro. Double hitch tiltable trailer. 3,977,726, Cl. 298-5.000.
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Produits Chimiques Ugine Kuhlmann: *See—*
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Purcell, Robert M. Separation chamber, holding tank, drainage system. 3,977,978, Cl. 210-521.000.
Putter, Rolf: *See—*
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Pyle, Kenneth E., to Reef-Baker Corporation. Condensate valve assembly. 3,977,426, Cl. 137-204.000.
Pyle, Owen, to Kingsford Company, The. Fluidized bed carbonization. 3,977,947, Cl. 201-27.000.
Quaas, Joseph F.: *See—*
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White, Jackie L., 3,977,414.
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Raatz, Charles F., Jr.; Woodbury, Russell K.; and Woodmansee, Wayne E., to Boeing Company, The. Apparatus and method for ultrasonic fastener hole inspection. 3,977,236, Cl. 73-67.80S.
Railsback, Henry E.: *See—*
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Randolph, Richard L.: *See—*
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Ranini, Daniel G., to Societe Anonyme: Poclain. Jib having two adjustable elements. 3,977,148, Cl. 52-721.000.
Ransburg Corporation: *See—*
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Rasmussen, Gregory K.; and Hrinevich, John, Jr., to General Motors Corporation. Ruthenium powder metal alloy and method for making same. 3,977,841, Cl. 29-182.000.
Ratcliffe, Alfonso Fred: *See—*
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Raymond Lee Organization, Inc., The: *See—*
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Casci, David A., 3,977,715.
Cerny, Otto G., 3,978,504.
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Gillespie, Roland A.; and Gillespie, Minnie M., 3,977,796.
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Raytheon Company: *See—*
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Razzano, John S., to General Electric Company. Process for producing diorganopolysiloxane oils. 3,978,104, Cl. 260-448.20E.
RCA Corporation: *See—*
Alig, Roger Casanova; and Onyshkevych, Lubomyr Stephen, 3,978,436.
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Hulls, Leonard Robin; and Hadden, Stephen Clow, 3,977,239.
Ito, Roy Atsushi; and Jones, Gary Arthur, 3,978,451.
Keigler, John Edward; Muhlfelder, Ludwig; and Cenker, Robert Joseph, 3,977,633.
Kessler, Sebastian William, Jr.; and Keller, Robert Franklin, 3,978,518.
Kumbatovic, Robert Anthony, 3,978,349.
Smith, Arthur Leo; and Shaffer, Donnavon David, 3,977,991.
Sutphin, Eldon Marvin, Jr., 3,978,416.
Vilkomerson, David Herman Raphael, 3,978,508.
Readal, Thomas C.; McKinney, Joel D.; and Titmus, Robert A., to Gulf Research & Development Company. Method of negating the effects of metals poisoning on cracking catalysts. 3,977,963, Cl. 208-120.000.
Rebold, Jerome, to CBS Inc. Convertible swivel knife. 3,977,077, Cl. 30-151.000.
Rebold, Jerome I., to CBS Inc. Knife having easily removable blade. 3,977,079, Cl. 30-336.000.
Recognition Equipment Incorporated: *See—*
Sanner, Medford Duane; Lafevers, Jim O.; and Mirci, Sauas, 3,978,450.
Redmond, John D., Jr.: *See—*
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Reed, Edward W.; and Sharpe, Edgar J., to Federal Drilling Supplies Limited. Wire line core barrel assembly. 3,977,482, Cl. 175-246.000.
Reed, Robert D.; and Koons, Harold F., to John Zink Company. Control of the viscosity of fuel oil for burners. 3,977,427, Cl. 137-334.000.
Reef-Baker Corporation: *See—*
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Reever, Richard E.; and Dasher, George F., to Alberto Culver Company. Manufacture of aerosol packages by undercap charging with carbon dioxide propellant. 3,977,151, Cl. 53-12.000.
Regie Nationale des Usines Renault: *See—*
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Reginato, Luigi; Bienfait, Charles; and Stevens, Jacques, to Solvay & Cie. Process for the polymerization of olefins and catalytic products. 3,978,031, Cl. 526-352.000.
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Reid, David L.; Flynn, Patrick F.; and Eberhard, Walter Wayne, to Cummins Engine Company, Inc. Diesel engine intake air preheater fuel control. 3,977,376, Cl. 123-122.00G.
Reid, David L., to Cummins Engine Company, Inc. Heat distribution passage for manifold heater system. 3,977,377, Cl. 123-122.00G.
Reilly, Joseph R.; and Witkowski, Leonard J., to Monsanto Company. Apparatus for continuous stretch-blow molding. 3,977,822, Cl. 425-387.00B.
Reinders, Michiel Antonius. Antenna reflector support. 3,978,486, Cl. 343-781.0EA.
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Fry, Franklin Hornor; Reinke, Orville; Marthaler, Wayne A.; Wylie, Richard K.; and Boye, Frederick C., 3,977,980.
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Reiter, Herbert, to Siemens Aktiengesellschaft. Switching arrangement for receiving DC signals. 3,978,283, Cl. 178-69.00A.
Reiter, Ralph H.; and Rosen, George, to Sun Chemical Corporation. Photopolymerization initiators. 3,978,133, Cl. 260-592.000.
Remery, Michel, to U.S. Philips Corporation. DC-AC inverter for supplying a discharge lamp. 3,978,390, Cl. 321-44.000.
Remington Arms Company, Inc.: *See—*
Anderson, Raymond A.; and Scanlon, John J., 3,977,326.
Remond, Georges: *See—*
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Remper, John A.: *See—*
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Renner, Alfred; and Hugi, Rolf, to Ciba-Geigy Corporation. Cyclic acetals containing epoxide groups. 3,978,087, Cl. 260-340.700.
Renner, Alfred; and Hugi, Rolf, to Ciba-Geigy Corporation. Cyclic acetals containing epoxide groups. 3,978,088, Cl. 260-340.900.
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Resnick, Paul Raphael, to Du Pont de Nemours, E. I., and Company. Polymers of fluorinated dioxoles. 3,978,030, Cl. 526-247.000.
Respiratory Care, Inc.: *See—*
Cornett, Walter G., III; and Gaspar, Donald G., 3,977,553.
Revesz, Akos G.; and Lindmayer, Joseph, to Communications Satellite Corporation (Comsat). Solar cell with niobium pentoxide antireflective coating. 3,977,905, Cl. 136-89.000.
Revlon, Inc.: *See—*
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Rhone-Poulenc Industries: *See—*
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Bouchaudon, Jean; Le Roy, Pierre; and Messer, Mayer Naoum, 3,978,078.
Chabardes, Pierre, 3,978,135.
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Daumas, Jean-Claude; Dupuy, Georges; and Michel, Max, 3,978,004.
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Richardson, Kay Keith. Exhaust control method and apparatus. 3,977,493, Cl. 181-42.000.
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Kawazu, Motoaki; Ide, Masataka; and Kawamura, Atsushi, 3,977,761.
Seko, Nachio; and Hirose, Hiroshi, 3,977,778.
Suzuki, Shigeru; Omi, Kyoji; and Tani, Tatsuo, formerly Nishikawa, 3,977,666.
Ridenour, Ralph G., to Universal Refrigeration Inc. Tube fitting assembly. 3,977,710, Cl. 285-382.500.
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Riedel, Wolfgang, to Robert Bosch G.m.b.H. Damper for motion picture film in cinematographic apparatus. 3,977,775, Cl. 352-159.000.
Rieger, Francis C.: *See—*
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Riker Laboratories, Inc.: *See—*
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Rimmer, Matthew P.; and Vanderhoff, John M., to Itek Corporation. Apodized optical system. 3,977,772, Cl. 350-205.000.
Ring, David F., to Kimberly-Clark Corporation. Internally adhesively bonded fibrous web. 3,978,257, Cl. 428-137.000.
Ringdal, Lars. Arrangement for hauling up, launching and storing of boats and the like. 3,977,030, Cl. 9-41.000.

Ritzenhoff, Hermann, to Gebruder Seidel KG. Metal tear-off cap. 3,977,556, Cl. 215-256.000.
Rivera, Jose L.; and Spector, George, to Rivera, Jose L. Pogo shoes. 3,977,094, Cl. 36-7.800.
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Robb, Robert A.: *See—*
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Roberts, Frederick D., to FMC Corporation. Fabrication of box parts from plastic material. 3,977,307, Cl. 93-49.00R.
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Roberts, Thomas C., to Curtiss-Wright Corporation. Dual fuel injection nozzle. 3,977,367, Cl. 123-8.090.
Robertson, Paul E. Extendable and flexible trailer mechanism. 3,977,691, Cl. 280-81.00R.
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Rochla, Kurt; Schneider, Horst; and Schwarzkopf, August, to Windmoller & Holscher. Method and apparatus for automatically packaging flexible flat goods. 3,977,152, Cl. 53-21.0FW.
Rochlitz, Jurgen, to Hoechst Aktiengesellschaft. Dual layer electrophotographic recording material. 3,977,870, Cl. 96-1.500.
Rock, Erich; and Mages, Bernhard, to Blum Gesellschaft m.b.H. Hinge device. 3,977,041, Cl. 16-129.000.
Rockwell International Corporation: *See—*
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Lee, Winston F. Z.; Hrivnak, James A.; and Speer, John R., 3,978,354.
Molina, Orlando G., 3,978,398.
Topol, Leo E., 3,977,830.
Rodondi, Andrew F., to General Motors Corporation. Transitional connector for printed circuits. 3,977,756, Cl. 339-176.0MF.
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Tantlinger, Keith W., 3,977,266.
Romberg, Felix B. Openable gate end for wire traction gate. 3,977,457, Cl. 160-328.000.
Romeo, Frank Candilora; and Carroll, John Warren, III, to Data General Corporation. Hand-operated scanner. 3,978,318, Cl. 235-61.11E.
Ronnhult, John Fritiof; Estmar, Ernst Goran; and Petersen, Bjarne Louis, to Saab-Scania Aktiebolag. Valve unit for braking pressure control in wheeled vehicles. 3,977,734, Cl. 303-21.00F.
Rorer, Donald R. Sequential cycling skin-packaging apparatus. 3,977,156, Cl. 53-112.00A.
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Rose, Allen J.; and Feldmahr, Walter, to Acco International Inc. Frame for suspension of data binders. 3,977,527, Cl. 211-46.000.
Rose, Paul L.; Whitney, William P.; and Williams, Thomas, to Corning Glass Works. Electrical heating unit. 3,978,316, Cl. 219-543.000.
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Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 3,978,172.
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Ross, William Alden, to Torrington Company, The. Friction twist knitting element. 3,977,217, Cl. 66-124.000.
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Roteman, Jerome, to American Can Company. Epoxy resin photoresist with iodoform and bismuth triphenyl. 3,977,874, Cl. 96-35.100.
Roteman, Jerome, to American Can Company. Epoxy resin photoresist with iodoform and bismuth triphenyl. 3,977,878, Cl. 96-86.00P.
Roth, Gary L.; and McGlamery, Merrill H., to Gates Rubber Company, The. Rechargeable battery enclosure. 3,977,907, Cl. 136-132.000.
Roth, Roy William, to American Cyanamid Company. Medical sponges. 3,977,406, Cl. 128-296.000.
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Rothlisberger, Kurt; and Vee, Richard F., to Teletype Corporation. Method and apparatus for mounting a cassette record-playback head. 3,978,522, Cl. 360-104.000.
Rotman, Lee, to A. L. Garber Co., The. Carton with double, wall and bottom. 3,977,593, Cl. 229-38.000.
Rouchon, Jean Marc: *See—*
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Rudd, George H. Intravenous alarm device. 3,977,567, Cl. 222-39.000.
Rudelstorfer, Heinrich: *See—*
Wallner, Felix; Oberhauser, Franz; Mildner, Heinz; Rudelstorfer, Heinrich; Drexler, Berndt; and Klicnik, Franz, 3,977,914.
Rudzit, Ernest Alexandrovich: *See—*
Buchin, Petr Ivanovich; Lipkin, Adolf Evgenievich; Rudzit, Ernest Alexandrovich; Zenin, Boris Alexeevich; Viderker, Maxim Georgievich; Smirnov, Viktor Alexandrovich; Balmasova, Irina Petrovna; Orlov, Evgeny Vladimirovich; and Chichkova, Larisa Alexandrovna, 3,978,082.
Ruegg, Edwin, to Maschinenfabrik u. Giesseri Netstal AG. Injection mold locking device and turntable. 3,977,661, Cl. 269-57.000.
Ruel E. Taylor, Inc.: *See—*
Taylor, Ruel E.; and Wormwood, Alston R., 3,977,671.
Ruff, David L.: *See—*
Tarbell, Harlan E.; Mogg, Donald W.; and Ruff, David L., 3,978,264.
Rushforth, George T., to Sun Chemical Corporation. Cart conveyor system. 3,977,513, Cl. 198-38.000.
Russ, Julio: *See—*
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Russell, Allen S.; Jarrett, Noel; Bruno, Marshall J.; Remper, John A.; and King, Larry K., to Aluminum Company of America. Antipollution method. 3,977,846, Cl. 55-79.000.
Ruta, Vladislav: *See—*
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Ryder, Alan, to Solartron Electronic Group Limited, The. Apparatus for producing an electrical output signal whose magnitude is linearly representative of the value of an unknown resistance. 3,978,402, Cl. 324-62.000.
Ryo-Nichi Co., Ltd.: *See—*
Nakanishi, Kakusaburo; and Yoshida, Tatsuro, 3,978,162.
S. G. Taylor Chain Company, Inc.: *See—*
Booth, Richard L., 3,977,180.
Saab-Scania Aktiebolag: *See—*
Ronnhult, John Fritiof; Estmar, Ernst Goran; and Petersen, Bjarne Louis, 3,977,734.
Sabre Saw Chain Limited: *See—*
Goldblatt, Lawrence; Weiss, Werner; and Mance, Vitomir, 3,977,288.
Sadashige, Takeshi. Process for producing sliced veneer. 3,977,449, Cl. 144-316.000.
Sadashige, Takeshi. Sliced veneer having a combination of wood grain patterns and fancy plywood therefrom. 3,977,933, Cl. 156-250.000.
Safe Electronic Systems S.A.: *See—*
DiCecco, Enio; and Totti, Mario Costante, 3,977,745.
Safetran Systems Corporation: *See—*
Smith, Richard E., 3,977,634.
Sagawa, Seiji; Yamato, Hideo; and Kanagawa, Shuichi, to Sumitomo Chemical Company, Limited. Inhibiting ozone deterioration of rubbers. 3,978,021, Cl. 260-45.9KA.
Sagorski, Peter A., to Ethyl Development Corporation. Demoiling apparatus. 3,977,585, Cl. 225-101.000.
Sahm, Peter, to Brown, Boveri & Company Limited. Method of applying a protective coating to a body. 3,978,253, Cl. 427-309.000.
Sahrbacker, Edward V., to Lucerne Products, Inc. Release mechanism for plug in-type terminals. 3,977,751, Cl. 339-95.00D.

Sainsbury, Cleo, to Airsamplex Corporation. Geological exploration method and apparatus. 3,977,479, Cl. 175-58.000.

St. Clair, Lawrence B.: *See—*
Salvati, John G.; and St. Clair, Lawrence B., 3,978,304.

Sair, Louis; and Quass, Donald W., to Griffith Laboratories, Inc., The. Process for producing puffed proteinaceous food products. 3,978,236, Cl. 426-445.000.

Sair, Louis, to Griffith Laboratories, Inc., The. Puffed proteinaceous food products and methods of producing same. 3,978,244, Cl. 426-580.000.

Saito, Eiji: *See—*
Kobayashi, Kunio; Saito, Eiji; Shiki, Satoshi; and Hayashi, Hiroshi, 3,977,607.

Saito, Mitsuo, to Fuji Photo Film Co., Ltd. Direct-positive emulsion containing silver halide grains internally doped with metal ions, surface ripened with gold and sulfur compound and fogged by light exposure. 3,977,880, Cl. 96-108.000.

Saito, Tetsu: *See—*
Mizuno, Kimio; Matsuda, Tetsuo; Asano, Katsumi; Yagi, Akira; Takada, Masaki; Saito, Tetsu; Toriya, Minoru; Satoi, Shuzo; and Matsuura, Kazuo, 3,978,210.

Sakai, Toshitaka: *See—*
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Sakamaki, Hisashi; Kimura, Yoshimasa; Honma, Toshio; Inuzuka, Tsuneki; and Furuichi, Katsushi, to Canon Kabushiki Kaisha. Warmth keeping method for copying machine. 3,977,782, Cl. 355-30.000.

Sakamoto, Akira: *See—*
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Sakamoto, Yoichi, to Matsushita Electric Industrial Co., Ltd. Sweep output generator having a frequency modulated local oscillator for the station selector of a television receiver. 3,978,411, Cl. 325-421.000.

Sakashita, Noriji, to Kabushiki Kaisha Kawai Gakki Seisakusho. Electronic musical instrument. 3,977,290, Cl. 84-1.010.

Sakata, Yoshihiro, to Hitachi Metals, Ltd. Inclined type centrifugal casting apparatus. 3,977,463, Cl. 164-291.000.

Sakate, Shigeki: *See—*
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Salathiel, William M.: *See—*
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Salmon, Marion B. Film winding and perforating apparatus. 3,977,617, Cl. 242-56.800.

Salton, Inc.: *See—*
Brown, Lester; and Moskowitz, Paul M., 3,977,612.
Moskowitz, Paul M., 3,977,613.

Salvati, John G.; and St. Clair, Lawrence B., to Westinghouse Electric Corporation. Enclosed circuit interrupter including externally operable handle mechanism. 3,978,304, Cl. 200-331.000.

Salvesen, Olaf: *See—*
Natvig, Birger Johannes; Sandnaes, Per Christian; Lindeberg, Per-Gustav; and Salvesen, Olaf, 3,977,346.

Sam P. Wallace Company, Inc.: *See—*
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Sampson Corporation, The: *See—*
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Samson Apparatebau AG: *See—*
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Samuel Moore and Company: *See—*
Phillippi, Larry R., 3,977,440.

Sanada, Noriaki, to Canon Kabushiki Kaisha. Device for setting camera. 3,978,501, Cl. 354-206.000.

Sand, Darrel R., to General Motors Corporation. Closed loop combustion pressure control. 3,977,373, Cl. 123-117.00A.

Sandbank, Carl Peter, to International Standard Electric Corporation. Optical coupler. 3,977,762, Cl. 350-96.0WG.

Sanders Associates, Inc.: *See—*
Saunders, Roger I., 3,977,031.

Sanders, James Milton; and Michael, Loren Hall, to International Flavors & Fragrances Inc. Process for production of isochromans. 3,978,090, Cl. 260-345.200.

Sanders, Ray W.; Keyes, Neil T.; Harting, Stephen W.; and Mueller, Donald J., to Computer Transmission Corporation. Method and apparatus for in-band signalling in data transmission. 3,978,449, Cl. 340-146.1BA.

Sandifer, Robert L. Pendulum toy. 3,977,085, Cl. 33-27.00L.

Sandnaes, Per Christian: *See—*
Natvig, Birger Johannes; Sandnaes, Per Christian; Lindeberg, Per-Gustav; and Salvesen, Olaf, 3,977,346.

Sandoz, Inc.: *See—*
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Bacso, Imre, 3,978,048.
Cooke, George A.; and Houlihan, William J., 3,978,086.
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Houlihan, William J.; and Nadelson, Jeffrey, 3,978,132.

Sandoz Ltd.: *See—*
Altiparmakian, Rodolf; and Bohler, Hans, 3,978,062.
Schaub, Fritz; and Schelling, Hans-Peter, 3,978,097.
Schelling, Hans-Peter; and Schaub, Fritz, 3,978,134.

Sands, Robert E.; Floren, Carl E.; and Hauffe, William L., to Mueller Co. Pipefitting securing tool. 3,977,066, Cl. 29-237.000.

Sandvik Aktiebolag: *See—*
Lindstrom, Jan Nils; and Ohlsson, Fall Johan Olof William, 3,977,061.

Sanner, Medford Duane; Lafevers, Jim O.; and Mirci, Sauas, to Recognition Equipment Incorporated. Image character reader system. 3,978,450, Cl. 340-146.3QC.

Sano, Ryuichi; Kurano, Nobuhiro; Iwai, Hiroshi; and Momiyama, Iwao, to Kansai Paint Company, Ltd. Inorganic coating compositions with alkali silicate. 3,977,888, Cl. 106-74.000.

Santroch, Gilbert L., to Raymond Lee Organization, Inc., The, a part interest. Cold weather shoe. 3,977,093, Cl. 36-2.600.

Sanyo Electric Co., Ltd.: *See—*
Miyake, Yuji; Kashihara, Hideo; Takahashi, Kazuyoshi; Yamamoto, Takamitu; and Morishita, Takuya, 3,977,037.

SAPAL Societe Anonyme des Plieuses Automatiques: *See—*
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Sarlab Aktiengesellschaft: *See—*
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Sarma, Bhupendra Nath. Digital private automatic branch exchange. 3,978,290, Cl. 179-15.0AT.

Sasaki, Seishi: *See—*
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Sato, Mikio; Toyomoto, Kazuo; Ibata, Jyoji; Suzuoki, Kazuhiro; Matsumoto, Yoshio; Matsuo, Shunji; Hayashi, Yashio; and Uda, Bunzo, to Asahi Kasei Kogyo Kabushiki Kaisha. Powder coating composition. 3,978,153, Cl. 260-835.000.

Sato, Takeo: *See—*
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Satoi, Shuzo: *See—*
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Satzinger, Gerhard; and Hechtfischer, Gustav, to Warner-Lambert Company. Process for substituted cyclohexenes. 3,978,109, Cl. 260-471.00A.

Satzinger, Gerhard: *See—*
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Sauer, Hans; and Spahrbier, Dieter, to Varta Batterie Aktiengesellschaft. Fuel cell system. 3,977,902, Cl. 136-86.00R.

Saunders, Rhoderick K.: *See—*
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Saunders, Roger I., to Sanders Associates, Inc. Inflation system. 3,977,031, Cl. 9-323.000.

Saurenman, Donald G. Static charge positioning of textile sliver in angled tubular feeder. 3,977,045, Cl. 19-159.00R.

Sawada, Ryosaku, to Kabushiki Kaisha Hanshin Gijutsu Kenkyusho. Apparatus for generating high-temperature and high-pressure gas. 3,977,185, Cl. 60-39.550.

Sawyer, Willard H.: *See—*
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Schaad, Howard A.; and Randolph, Richard L. Method and apparatus for communicating in building structures and parts thereof particularly multi-story building. 3,978,469, Cl. 340-310.00R.

Schairer, George S.: *See—*
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Schampier, Virginia, to Lawrence Peska Associates, Inc. a part interest. Spring top and laundry bag. 3,977,450, Cl. 150.000.

Scharf, Regine: *See—*
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Schaub, Andres: *See—*
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Schaub, Fritz; and Schelling, Hans-Peter, to Sandoz Ltd. Ether and thioether substituted 3,4-alkylenedioxybenzenes. 3,978,097, Cl. 260-340.500.

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Scheidt, James E.: *See—*
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Schelling, Hans-Peter; and Schaub, Fritz, to Sandoz Ltd. Ether of thioether substituted benzaldehydes. 3,978,134, Cl. 260-599.000.

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Scherer, Carl A.; and Muirhead, Hugh J., to General Motors Corporation. Freeze throttling valve. 3,977,207, Cl. 62-217.000.

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Steinman, Martin; and Tahbaz, Pirouz, 3,978,224.

Schewe, Richard A., to Barber-Colman Company. Modular open end spinning machine. 3,977,168, Cl. 57-1.00R.
Schick, Hans; Mueller-Tamm, Heinz; and Hennenberger, Peter, to BASF Aktiengesellschaft. Manufacture of a modified titanium component for Ziegler-Natta catalysts. 3,977,997, Cl. 252-429.00B.
Schiele, Otto; and Florjancic, Dusan, to Klein, Schanzlin & Becker Aktiengesellschaft. Method and means for abruptly terminating the flow of fluid in closed circulating systems of nuclear reactor plants or the like. 3,977,808, Cl. 415-1.000.
Schieman, Richard D., to Standard Oil Company. Stabilization of hydrocracked lube oils. 3,977,964, Cl. 208-327.000.
Schildbach, August J., to Brunswick Corporation. Method of continuously producing fine metal filaments. 3,977,070, Cl. 29-423.000.
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Schilling, Ernst, to Siemens Aktiengesellschaft. Vacuum sealing apparatus. 3,977,428, Cl. 137-340.000.
Schirmann, Jean-Pierre; Tellier, Pierre; Mathais, Henri; and Weiss, Francis, to Produits Chimiques Ugine Kuhlmann. Process for the preparation of hydrazine compounds. 3,978,049, Cl. 260-240.00G.
Schiro, Phillip, to Estrada, Joe Jess. Preservative process for produce using a composition comprising sodium hypochlorite and alkali earth metal phosphates and composition. 3,978,235, Cl. 426-335.000.
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Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, to American Cyanamid Company. Catalysts based on carbon supports. 3,978,000, Cl. 252-447.000.
Schmitz, Lawrence S., to Westinghouse Electric Corporation. Trouble indicator circuit for a security system. 3,978,475, Cl. 340-409.000.
Schmitz, Lawrence S., to Westinghouse Electric Corporation. Automatic test sequence circuit for a security system. 3,978,477, Cl. 340-410.000.
Schmitz, Lawrence S., to Westinghouse Electric Corporation. Reset circuit for a security system. 3,978,478, Cl. 340-420.000.
Schmitz, Lawrence S., to Westinghouse Electric Corporation. Solid state security system. 3,978,479, Cl. 340-420.000.
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Schneider, Johann Friedrich. Pipe elbow. 3,977,706, Cl. 285-157.000.
Schoenebeck, Karl-Heinz, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Method of attaching tension rods to cables and tension rod cable assemblies made thereby. 3,978,188, Cl. 264-139.000.
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Scholle, William R., to Scholle Corporation. Drink dispenser. 3,977,569, Cl. 222-105.000.
Schonstedt, Erick O., to Schonstedt Instrument Company. Method of manufacturing a magnetic locator. 3,977,072, Cl. 29-602.00R.
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Schreiberg, Harry. Cycle storage, shipping and conveying means. 3,977,720, Cl. 296-137.00C.
Schrenk, Walter J., to Dow Chemical Company, The. Container for food products and method for making same. 3,977,153, Cl. 53-40.000.
Schrider, Michael Stanley; and Levy, Stephen David, to American Cyanamid Company. O,O,O′,O′-Tetramethyl O,O′-trithiodi-p-phenylene ester. 3,978,168, Cl. 260-930.000.
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Schrodter, Hermann; Stephan, Hans-Werner; and Heymer, Gero, to Hoechst Aktiengesellschaft. Process for the production of substantially water-insoluble linear ammonium polyphosphates. 3,978,195, Cl. 423-305.000.
Schroeder, Becky J. Luminescent backing sheet for reading and writing in the dark. 3,978,340, Cl. 250-462.000.
Schroff, Dennis E., to General Motors Corporation. Gas turbine control. 3,977,182, Cl. 60-39.270.
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Schulte-Elte, Karl-Heinrich; Joyeux, Michel; and Ohloff, Gunther, to Firmenich S.A. Sesquiterpenic derivatives as odor- and taste-modifying agents. 3,978,008, Cl. 252-522.000.
Schulte-Elte, Karl-Heinrich, to Firmenich S.A. Substituted (2-methyl-5-isopropyl-cyclopent-1-en-1-yl)s as odor-modifying agents. 3,978,009, Cl. 252-522.000.
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Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, to United States of America, Agriculture. Arthropod maturation inhibitors. 3,978,230, Cl. 424-331.000.
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Seabrook, William B. Feed roll drive. 3,977,268, Cl. 74-417.000.
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Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Manufacture of low molecular weight block copolymers of vinyl or diene monomers and alkylene oxides. 3,978,160, Cl. 260-874.000.
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Self, James M., to H. H. Robertson Company. Polymerizable compositions containing unsaturated polyester resins and aqueous alkali stabilized colloidal silica, method of preparing shaped articles from such compositions and thermoset products thereof. 3,978,018, Cl. 260-40.00R.
Selwood, Alan, to Imperial Chemical Industries Limited. Compact twistless textile yarn comprising discontinuous fiber bonded by potentially adhesive composite fibers. 3,978,267, Cl. 428-360.000.

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Senseman, Wesley K.: *See—*
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Sergeev, Vitaly Andreevich: *See—*
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Seto, Yutaka, to Konishiroku Photo Industry Co., Ltd. Sheet conveyor mechanism. 3,977,673, Cl. 271-277.000.

Seymour, Laurence E. Fishing rod holder with down rigger attachments. 3,977,118, Cl. 43-21.200.

Shaffer, Donnavon David: *See—*
Smith, Arthur Leo; and Shaffer, Donnavon David, 3,977,991.

Shaffer, Walter M.: *See—*
Crawford, John T.; and Shaffer, Walter M., 3,977,550.

Shanahan, Richard Sidney: *See—*
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Shank, Charles Vernon: *See—*
Ippen, Erich Peter; and Shank, Charles Vernon, 3,978,429.

Sharpe, Edgar J.: *See—*
Reed, Edward W.; and Sharpe, Edgar J., 3,977,482.

Shavel, John, Jr.: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 3,978,073.

Shay, Joseph Leo: *See—*
Kasper, Horst Manfred; Migliorato, Piero; Shay, Joseph Leo; and Wagner, Sigurd, 3,978,510.

Shearer, Charles John; and de Bartolome, Charles Arthur Martin, to Shearer, Charles John. Apparatus for mixing particulate solids. 3,977,657, Cl. 259-180.000.

Shearing, Herbert Jackson, to Imperial Chemical Industries Limited. Cement compositions. 3,977,889, Cl. 106-96.000.

Sheehan, John T.; and Ondetti, Miguel A., to E. R. Squibb & Sons, Inc. L-Aspartyl dipeptides as sweetening agents. 3,978,034, Cl. 260-112.50R.

Sheerin, Thomas J., to Mobil Oil Corporation. Process of preparing naphthyl acetals. 3,978,139, Cl. 260-613.00D.

Sheets, Charles Elmer, Jr., to J. I. Case Company. Temperature responsive fluid flow regulator. 3,977,600, Cl. 236-93.00R.

Sheldon, Robert T. Vehicular herbicide sprayer. 3,977,605, Cl. 239-104.000.

Shell Oil Company: *See—*
Anderson, Victor F., 3,977,572.
Bright, D. Bruce; and Alderholt, Paul J., 3,978,010.
Broussard, Douglas E.; Scott, Paul R.; and Kruka, Vitold R., 3,977,469.
Dunlop, Arthur K.; and Vasilevskis, Janis, 3,977,981.
Marshall, Clifford D., 3,978,027.
van Beem, Eric J.; and Brasser, Pieter, 3,978,014.

Sherman, Robert, to United Technologies Corporation. Actuator with feedback. 3,977,300, Cl. 91-384.000.

Shiba, Keisuke; and Sato, Akira, to Fuji Photo Film Co., Ltd. Spectrally sensitized silver halide photographic emulsion. 3,977,882, Cl. 96-124.000.

Shibata, Fujio: *See—*
Umeki, Shinji; Shibata, Fujio; and Takada, Kazuo, 3,977,985.

Shibata, Kazuo; and Kasai, Seiji, to Nissan Motor Co., Ltd. Fluid pressure control device for shuttleless weaving loom. 3,977,442, Cl. 139-435.000.

Shibata, Kunio: *See—*
Kosaka, Kenzo; Morioka, Shin; Shibata, Kunio; Goto, Takashi; and Takahashi, Eizi, 3,977,173.

Shibata, Masashi: *See—*
Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; Takeda, Yasuo; and Takahashi, Yoshitaka, 3,977,838.

Shibata, Toshio: *See—*
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Shiki, Satoshi: *See—*
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Shimamura, Tadao: *See—*
Matsumoto, Youichi; Yokoyama, Seijiro; and Shimamura, Tadao, 3,978,406.

Shimizu, Nobuzo. Electric hair drier with air blowing condition indicator. 3,978,314, Cl. 219-361.000.

Shimomura, Naonobu. Digital polynomial function generator. 3,978,326, Cl. 235-152.000.

Shin-Kobe Electric Machinery Co., Ltd.: *See—*
Kitai, Yasuo, 3,977,908.

Shindo, Noboru; Hashizume, Hiroshi; and Kikuchi, Shuichi, to Murata Kikai Kabushiki Kaisha. False twisting spindle. 3,977,171, Cl. 57-77.300.

Shipley Company, Inc.: *See—*
Gulla, Michael; and Gaputis, Charles A., 3,977,884.

Shirey, Robert D., to Emerson Electric Co. Method of making electric immersion heaters. 3,977,073, Cl. 29-611.000.

Shono, Tetsuji, to Asahi Kogaku Kabushiki Kaisha. Light shield mechanism for quadrilateral opening. 3,978,503, Cl. 354-250.000.

Showa High Polymer Co., Ltd.: *See—*
Takiyama, Eiichiro; Sugimoto, Toshiaki; and Hanyuda, Toshiaki, 3,978,155.

Shuck, Lowell Z., to United States of America, Energy Research and Development Administration. Method for laser drilling subterranean earth formations. 3,977,478, Cl. 175-16.000.

Shunan Petrochemical Company, Ltd.: *See—*
Murakami, Ryuzo; Kato, Shigeaki; and Kaya, Yoshihiro, 3,977,936.

Shuster, Edward J.: *See—*
Hall, John B.; Hruza, Denis E.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 3,978,239.
Mookherjee, Braja Dulal; Trenkle, Robert Walter; Vock, Manfred Hugo; and Shuster, Edward J., 3,977,419.

Shuster, Yan; Mikazhan, Valdis Danielovich; Pormale, Milda Yanovna; Kashkina, Nadezhada Alexandrovna; and Kalninsh, Arvid Yanovich. Local anaesthetic. 3,978,215, Cl. 424-180.000.

Siatkowski, Raymond E. Palatal expander. 3,977,082, Cl. 32-14.00E.

Sibley, Bruce D.: *See—*
Swander, Kenneth D., Jr.; and Sibley, Bruce D., 3,977,308.

Siclari, Francesco; Perazzoni, Pierluigi; and Silvestroni, Piergiorgio, to Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A. Method and additives for imparting antistatic properties to polyamide compositions and polyamides obtained according to said method and with the use of said additives. 3,978,098, Cl. 260-404.000.

Siddall, Keith, to Osborn-Mushet Tools Limited. Twist drills. 3,977,807, Cl. 408-223.000.

Siddiqui, Iftikhar Hussain: *See—*
Coates, Harold; Collins, John Desmond; and Siddiqui, Iftikhar Hussain, 3,978,102.

Siemens Aktiengesellschaft: *See—*
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Edel, Bernhard; and Pierer, Gerhard, 3,977,755.
Gupta, Jutta Das; Markwitz, Wernhard; and Ollinger, Max, 3,978,408.
Hassler, Dieter, 3,977,247.
Huber, Josef, 3,978,327.
Reiter, Herbert, 3,978,283.
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Schwabe, Ulrich, 3,977,925.

SIG Schweizerische Industrie-Gesellschaft: *See—*
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Sigma Diesel: *See—*
Gauche, Claude, deceased; and Gauche nee Lelandais, Michele, administratrix, 3,977,343.

Sigmatex, A.G.: *See—*
Weman, Per-Olaf, 3,977,701.

Sigmon Corporation: *See—*
Sigmon, James W., 3,977,648.

Sigmon, James W., to Sigmon Corporation. Rotary motion valve and actuator. 3,977,648, Cl. 251-59.000.

Silsby, Stanley D.; and Tatro, Henry J., to Colt Industries Operating Corporation (Firearms Division). Hydraulic buffer assembly for automatic or semiautomatic firearm. 3,977,296, Cl. 89-198.000.

Silvestroni, Piergiorgio: *See—*
Siclari, Francesco; Perazzoni, Pierluigi; and Silvestroni, Piergiorgio, 3,978,098.

Silvey, George E. Tree felling method. 3,977,446, Cl. 144-34.00B.

Simm, Walter, to AGFA-Gevaert, A.G. Process for the electrographic recording of charge images in a low electron affinity case. 3,978,492, Cl. 346-74.00J.

Simm, Wolfgang: *See—*
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Simmler, Werner: *See—*
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Simmonds, Leonard B.: *See—*
Kultzow, Robert J.; and Simmonds, Leonard B., 3,978,359.

Simmons, Carl Edward, to United Aircraft Products, Inc. Heat transfer system. 3,977,206, Cl. 62-170.000.

Simon, Theodore. Alarm system including remote signalling means. 3,978,466, Cl. 340-274.00R.

Simonovitch, Chaim: *See—*
Haber, Raphael Ralph G.; and Simonovitch, Chaim, 3,978,072.

Simons, Carel Arthur Jan: *See—*
Bouwhuis, Gijsbertus; Franken, Adrianus Jacobus Jozef; and Simons, Carel Arthur Jan, 3,978,278.

Simplex Time Recorder Company: *See—*
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Sincich, Robert: *See—*
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Singer Company, The: *See—*
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Sinitsyn, Alexandr Nikolaeylich: *See—*
Kalnberz, Viktor Konstantinovich; and Sinitsyn, Alexandr Nikolaeylich, 3,977,397.

Sioli, Giancarlo; Giuffre, Luigi; Righi, Franco; and Matera, Giancarlo, to Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A. Method for the production of alicyclic anhydrides. 3,978,120, Cl. 260-547.000.

Siter, Ralph B., Jr.: *See—*
Poffenberger, James C.; Corkran, William F.; Siter, Ralph B., Jr.; and Champa, Raymond J., 3,978,276.

Sjobom, Axel Henning, to SCA Development Aktiebolag. Apparatus for refining fiber material. 3,977,611, Cl. 241-251.000.

SKF Industrial Trading and Development Company, B.V.: *See—*
Johansson, Carl-Eric, 3,977,212.
Lundberg, Sten, 3,977,741.

Slade, Paul G., to Westinghouse Electric Corporation. Low-voltage circuit-breaker having small contact separation and small gap between cooperating parallel-arranged arcing-rails. 3,978,300, Cl. 200-147.00R.

Sloan, Robert I., to TSSET Scientific and Pharmaceutical Limited. Dental hygienic device. 3,977,084, Cl. 32-59.000.

Smadja, Dora; Decker, Marie-Therese; Derouet, Francoise; and Lorin, Guy, to Oxy Metal Industries Corporation. Process for reducing the rate of sludge formation in crystalline phosphatizing baths. 3,977,912, Cl. 148-6.15R.

Smirnov, Igor Nikolaevich; Semenov, Mikhail Ivanovich; Zjuzenko, Nikolai Vasilievich; and Sergeev, Vitaly Andreevich. Hydraulic drive pulsator of reciprocating action. 3,977,192, Cl. 60-543.000.

Smirnov, Viktor Alexandrovich: *See—*
Buchin, Petr Ivanovich; Lipkin, Adolf Evgenievich; Rudzit, Ernest Alexandrovich; Zenin, Boris Alexeevich; Viderker, Maxim Georgievich; Smirnov, Viktor Alexandrovich; Balmasova, Irina Petrovna; Orlov, Evgeny Vladimirovich; and Chichkova, Larisa Alexandrovna, 3,978,082.

Smith, Arthur Leo; and Shaffer, Donnavon David, to RCA Corporation. Manganese-and-magnesium-activated strontium sulfide phosphors. 3,977,991, Cl. 252-301.40S.

Smith, Conrad B.: *See—*
Thiessen, Leo K.; and Smith, Conrad B., 3,977,705.

Smith, David S., to Eastman Kodak Company. Biological fluid dispenser for dispensing micro amounts. 3,977,568, Cl. 222-80.000.

Smith, Harry: *See—*
Buckle, Derek Richard; and Smith, Harry, 3,978,231.

Smith, Hubert Stacy, Jr., to Dow Chemical Company, The. Foldable composite reinforcing member for use in a foam structure. 3,978,255, Cl. 428-47.000.

Smith, Jack R., to Westinghouse Electric Corporation. Electric power plant having a gas turbine with an improved wide range surge protection system. 3,977,184, Cl. 60-39.18B.

Smith, Richard E., to Safetran Systems Corporation. Computer for motion sensing device setup. 3,977,634, Cl. 246-128.000.

SmithKline Corporation: *See—*
Baile, Clifton A.; Kingsbury, William D.; and Parish, Roger C., 3,978,221.
Bender, Allan D.; Berkoff, Charles E.; and Groves, William G., 3,978,225.

Smrt, Thomas J. Spraying apparatus. 3,977,570, Cl. 222-174.000.

Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A.: *See—*
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Sioli, Giancarlo; Giuffre, Luigi; Righi, Franco; and Matera, Giancarlo, 3,978,120.

Snijders, Wilfred Andre Maria: *See—*
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Sobel, Lucien: *See—*
Nagy, Georges; Balde, Daniel; Sobel, Lucien; and Parvi, Ludovic, 3,978,169.

Sobottka, Gert; Pagenkemper, Peter; Eisenburger, Heinrich; and Schoof, Werner, to Deutsche Edelstahlwerke Aktiengesellschaft. Permanent magnet holding system. 3,978,441, Cl. 335-284.000.

Societe Anonyme Automobiles Citroen: *See—*
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Societe Anonyme D.B.A.: *See—*
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Societe Anonyme des Ateliers de Secheron: *See—*
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S.A. des Etablissements Roure-Bertrand Fils & Justin Dupont: *See—*
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Societe Anonyme dite: Frimair S.A.: *See—*
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Societe Anonyme: Poclain: *See—*
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Societe d'Assistance Technique pour Produits Nestle S.A.: *See—*
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Societe de Participations Etudes et Realisations (SPER): *See—*
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Societe des Condenseurs Delas: *See—*
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Societe d'Etudes de Machines Thermiques: *See—*
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Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France: *See—*
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Societe Europeene de Propulsion: *See—*
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Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM): *See—*
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Societe Generale des Ciments Portland de l'Escaut: *See—*
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Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
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Societe Nationale Industrielle Aerospatiale: *See—*
Bordat, Andre Jules Edmond; and Pouillot, Michel Auguste Achille, 3,977,348.

Societe Soberal S.A.: *See—*
Zephinie, Gerard, 3,977,495.

Solartron Electronic Group Limited, The: *See—*
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Solomons, William Ebenezer: *See—*
Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, 3,978,067.

Solvay & Cie: *See—*
Reginato, Luigi; Bienfait, Charles; and Stevens, Jacques, 3,978,031.

Sommer, Friedrich: *See—*
Langer, Erich; Jahnke, Uwe; and Sommer, Friedrich, 3,978,521.

Sommer, Richard; and Wolfrum, Gerhard, to Bayer Aktiengesellschaft. Disulphimidophenyl-azo-naphthyl-azo-aminophenyl dyestuffs. 3,978,039, Cl. 260-187.000.

Sondergaard, Jorgen, to C.O. Hansen MASKINFABRIK af 1970 A/S. Operating mechanism for turning an axle end. 3,977,305, Cl. 92-31.000.

Sonnet, Philip E.: *See—*
Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, 3,978,230.

Sound Technology, Inc.: *See—*
Lum, Jack G. S., 3,978,401.

Southard, James S., to C. G. Conn, Ltd. Attenuator network for musical instrument keying system. 3,977,291, Cl. 84-1.130.

Southwest Products Co.: *See—*
Hackman, Kenneth V., 3,977,532.

Southwire Company: *See—*
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Southworth, Hamilton, Jr.: *See—*
Bergeron, Robert Francis, Jr.; and Southworth, Hamilton, Jr., 3,978,291.

Sowards, Donald Maurice, to Du Pont de Nemours, E. I., and Company. Fixed-bed vapor/solids contacting device. 3,977,090, Cl. 34-9.000.

Spaan, Josef A. E.; Veenstra, Pieter C.; and Oomens, Johannes M. M. Apparatus for exchange of substances between two media on opposite sides of a membrane. 3,977,976, Cl. 210-321.00B.

Spahrbier, Dieter: *See—*
Sauer, Hans; and Spahrbier, Dieter, 3,977,902.

Spark, Ian J.; Rossin, Joseph M.; and Sincich, Robert, to Gippsland Institute of Advance Education. Orbital displacers. 3,977,369, Cl. 123-8.430.

Spaulding, Harold E., to Certain-teed Corporation. Batt stacker/-loader. 3,977,155, Cl. 53-59.00R.

Speck, Willy. Water current-producing apparatus. 3,977,027, Cl. 4-172.160.

Spector, George: *See—*
Rivera, Jose L.; and Spector, George, 3,977,094.

Speer, John R.: *See—*
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Speer, Richard C.: *See—*
Jordan, Charles L.; and Speer, Richard C., 3,977,341.

Spencer, Donald B.; and Ferguson, John E., to Guy F. Atkinson Company. Explosively actuated overspeed decoupler. 3,977,213, Cl. 64-28.00R.

Spencer, Paul Anthony: *See—*
Dolby, Ray Milton; and Spencer, Paul Anthony, 3,978,409.

Spener, Gerhard: *See—*
Huschka, Hans; Heit, Werner; Herrmann, Franz-Josef; and Spener, Gerhard, 3,978,177.

Sperry Rand Corporation: *See—*
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Sphere Investments Limited: *See—*
Gordon, Roderick J.; and Gordon, Hilton P., 3,977,526.

Spicar, Erich, to Allmanna Svenska Elektriska Aktiebolaget. Clamping of transformer windings by means of hydraulic power amplifiers. 3,978,442, Cl. 336-92.000.

Spiesberger, August, to Gerhard Berger Fabrikation Elektrischer Messgerate. Self-starting synchronous motor with permanent magnet rotor. 3,978,356, Cl. 310-156.000.

Spitz, Erich: *See—*
d'Auria, Luigi; Le Guen, Benoit; and Spitz, Erich, 3,977,764.

Sprankle, Roger S., to Hydrothermal Power Co., Ltd. Throttling means for geothermal streams. 3,977,818, Cl. 418-201.000.

Spreitzhofer, Ernst Gunther Robert: *See—*
Henninger, Heinz W.; Kiefer, Hans W.; Riethmuller, Lothar H.; and Spreitzhofer, Ernst Gunther Robert, 3,978,348.

Sproul, Nolte V., to Aspro, Incorporated. Method of making poly-V pulleys and product. 3,977,264, Cl. 74-230.800.

Square D Company: *See—*
Pettit, Dorn L., 3,978,400.

Staley, David R. Support means for a hook member or the like. 3,977,643, Cl. 248-339.000.

Stalley, Anthony Donald; and Coffey, John Albert, to Quantel Limited. Digital time base correctors for television equipment. 3,978,519, Cl. 358-8.000.

Standard Car Truck Company: *See—*
Bullock, Robert L., 3,977,332.

Standard Oil Company: *See—*
Grasselli, Robert K.; and Friederich, Maria S., 3,978,003.
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Standard Pressed Steel Co.: *See—*
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Stauffer Chemical Company: *See—*
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Pallos, Ferenc M.; and DeBaun, Jack R., 3,978,219.

Stauner, Thomas; and Kyburz, Rolf, to Ciba-Geigy AG. Acylurea compounds. 3,978,122, Cl. 260-553.00E.

Stayner, Robert A.; Fox, Richard C.; and Jones, Thorton K., to Chevron Research Company. Wax-flux composition containing alkylaryl sulfonic acid for soldering. 3,977,916, Cl. 148-23.000.

Steag Aktiengesellschaft: *See—*
Seick, Gunter, 3,977,730.

Stearns, Charles F., to United Technologies Corporation. Adjusting mechanism and method for fuel control. 3,977,183, Cl. 60-39.020.

Steel Company of Canada, Limited, The: *See—*
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Steelcase, Inc.: *See—*
Fries, Bernard J.; and Molander, Lance E., 3,977,932.

Steele, Edward R., to Tektronix, Inc. Cathode ray storage tube having a target dielectric provided with collector electrode segments extending therethrough. 3,978,366, Cl. 313-398.000.

Steele, Roger B.: *See—*
Katzakian, Arthur, Jr.; Weyland, Herman H.; Steele, Roger B.; and Gold, Marvin H., 3,977,996.
Katzakian, Arthur, Jr.; Weyland, Herman H.; Steele, Roger B.; and Gold, Marvin H., 3,978,026.

Steger, James O., to Ball Corporation. Audio dosimeter. 3,977,257, Cl. 73-558.000.

Stein, Dieter: *See—*
Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, 3,978,160.

Steine, Hans T.; Simm, Wolfgang; and Quaas, Joseph F., to Eutectic Corporation. Indium-containing, low silver copper-base filler metal. 3,977,869, Cl. 75-153.000.

Steinman, Martin; and Tahbaz, Pirouz, to Schering Corporation. Antimicrobial halo-substituted-2-cyanoethylaminoalkyl-3-phenylindoles. 3,978,224, Cl. 424-274.000.

Stelber Industries Inc.: *See—*
Cristie, Martin, 3,977,270.

Stephan, Hans-Werner: *See—*
Schrodter, Hermann; Stephan, Hans-Werner; and Heymer, Gero, 3,978,195.

Sterling Drug Inc.: *See—*
Pradt, Louis A.; and Meidl, John A., 3,977,966.

Sterling Electronics Corporation: *See—*
Hamby, Bill L., 3,978,308.

Stetson, Alvin R.; and Moore, Victor S., to International Harvester Company. Aluminide coatings. 3,978,251, Cl. 427-229.000.

Stevens, Jacques: *See—*
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Stevenson, James S. Hose reel assembly. 3,977,429, Cl. 137-355.270.

Stevenson, Thomas; and Scanlon, John J., Jr., to United States of America, Army. Sabotless micro projectile. 3,977,324, Cl. 102-38.000.

Stewart, John E., to Nursery Implements, Inc. Nursery stocks digging machine. 3,977,099, Cl. 37-2.00R.

Stieringer, Albert, to Robert Bosch G.m.b.H. Electronic flash unit. 3,978,370, Cl. 315-151.000.

Stikeleather, Larry F.: *See—*
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Stocker, Hans: *See—*
Wunsch, Erich; Wendlberger, Gerhard; Jaeger, Ernst; Scharf, Regine; Deimer, Karl-Heinz; and Stocker, Hans, 3,978,035.

Stoffer, Lewis J.: *See—*
Mitchell, Stephen C.; Adamson, Arthur P.; Grandey, Max F.; and Stoffer, Lewis J., 3,977,728.

Stoll, Max: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,978,241.

Stoltman, Donald D., to General Motors Corporation. Engine air-fuel ratio control means. 3,978,175, Cl. 261-50.00A.

Stolzer, Paul, to STOPA Stahlbau GmbH & Co. Kommanditgesellschaft fur Schweisstechnik. Storage frames with deflection bar to pivot tines on a gantry. 3,977,542, Cl. 214-16.40A.

Stone, Michael B. Infrared technique for aerodynamic flow visualization. 3,977,244, Cl. 73-147.000.

STOPA Stahlbau GmbH & Co. Kommanditgesellschaft fur Schweisstechnik: *See—*
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Stork, Edward L.: *See—*
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Stoss, Peter; and Satzinger, Gerhard, to Warner-Lambert Company. Phenothiazine-S-oximide compounds. 3,978,052, Cl. 260-243.00A.

Stout, Vincent H. Hydrocarbon recovery system. 3,977,960, Cl. 208-11.00R.

Strachan & Henshaw Limited: *See—*
Bowman, Kenneth Albert; Breddy, Royston Gilbert; and West, Royston John, 3,977,665.

Strattwell Developments Limited: *See—*
Clark, Peter John; and Shanahan, Richard Sidney, 3,977,220.

Strautins, Juris: *See—*
Hill, Donald Franklin; and Strautins, Juris, 3,977,566.

Strickland, Robert V. Clamp bar for drapery tables. 3,977,103, Cl. 38-108.000.

Strobach, Carl G.; Daugirda, Paul G.; and Fahey, William E., to Rheem Manufacturing Company. Sacrificial, shaped anode and method of constructing same. 3,978,309, Cl. 219-104.000.

Strobe, Carl J.; and Wells, Robert A. Can end with nondetachable tear tab and opening ring. 3,977,561, Cl. 220-269.000.

Stroezel, Reinhold, to Robert Bosch G.m.b.H. Electric power tool with torque-dependent speed regulation. 3,978,385, Cl. 318-337.000.

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Stroobants, Alphonse. Can feeding and coating apparatus. 3,977,358, Cl. 118-2.000.

Strother, Jack B.: *See—*
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Structural Accessories, Inc.: *See—*
Galbreath, Richard N., 3,977,802.

Struttmann, Hilarius S., to Borg-Warner Corporation. Roller bearing improvement. 3,977,740, Cl. 308-194.000.

Stubbins, Derek, to Davy-Loewy Limited. Conveying systems. 3,977,224, Cl. 72-201.000.

Studiengesellschaft Kohle m.b.H: *See—*
Wilke, Gunther; Bogdanovic, Borislav; and Pauling, Horst, 3,978,147.

Stull, James C. Portable apparatus for compressing gases such as air. 3,977,815, Cl. 417-323.000.

Stumpe, Nelson A., Jr.; and Railsback, Henry E., to Phillips Petroleum Company. Elastomeric blend. 3,978,165, Cl. 260-894.000.

Stumpf, Joseph G.; and Testani, Richard L., to Frigitronics of Conn., Inc. Pressurized fluid container with built in filter. 3,977,560, Cl. 220-265.000.

Stupar, John A. Multi-purpose identification tag and clip. 3,977,104, Cl. 40-2.00R.

Sturhan, Klaus, to Gebr. Isringhausen. Seat construction. 3,977,644, Cl. 248-384.000.

Suda, Yoshitaka: *See—*
Tsuchiya, Shigeru; Suda, Yoshitaka; Chiyomaru, Isao; Kawada, Seigo; and Takita, Kiyoshi, 3,978,091.

Sudler, Roland: *See—*
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Sudo, Osamu, to Nippon Oil Seal Industry Co., Ltd. Device for sealing steel doors of coke oven. 3,977,125, Cl. 49-480.000.

Sugasawara, Michio, to Sugatsune Industrial Co., Ltd. Castor. 3,977,040, Cl. 16-45.000.

Sugatsune Industrial Co., Ltd.: *See—*
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Sugihara, Kunihiko: *See—*
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Sugimoto, Toshiaki: *See—*
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Sullivan, William A.: *See—*
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Sumitomo Chemical Company, Limited: *See—*
Hanma, Noritaka; Fukumura, Masataka; Maeshima, Kaoru; and Nakagome, Takenari, 3,978,053.
Konishi, Seizo; Ishii, Koichi; Abeta, Sadaharu; and Okaniwa, Tetuo, 3,977,827.
Sagawa, Seiji; Yamato, Hideo; and Kanagawa, Shuichi, 3,978,021.

Summerlin, Frederick Arthur: *See—*
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Sun Chemical Corporation: *See—*
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Sundermann, Rudolf; Putter, Rolf; and Grigat, Ernst, to Bayer Aktiengesellschaft. Process for preparing s-triazine prepolymers by condensation of an aromatic polyhydroxy compound with cyanuric chloride and thereafter reacting the condensation product with cyanogen halide in the presence of base. 3,978,028, Cl. 260-61.000.

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Sunlife S.p.A.: *See—*
Bearzi, Vittorio, 3,977,601.

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Suzuki, Akira: *See—*
Yukuta, Toshio; Moki, Takao; Ohashi, Takashi; Iwami, Kouichi; and Suzuki, Akira, 3,978,154.

Suzuki, Mamoru; Yasui, Yoshiharu; and Watanabe, Kenichi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Sound reducing device in textile machine. 3,977,169, Cl. 57-1.00R.

Suzuki, Naoyuki: *See—*
Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, 3,978,180.

Suzuki, Shigeru; Omi, Kyoji; and Tani, Tatsuo, formerly Nishikawa, to Ricoh Co., Ltd. Apparatus for selectively feeding sheets from a plurality of cassettes. 3,977,666, Cl. 271-9.000.

Suzuoki, Kazuhiro: *See—*
Sato, Mikio; Toyomoto, Kazuo; Ibata, Jyoji; Suzuoki, Kazuhiro; Matsumoto, Yoshio; Matsuo, Shunji; Hayashi, Yashio; and Uda, Bunzo, 3,978,153.

Svaty, Vladimir, to Elitex, Zavody textilniho strojirenstvi generalni reditalstvi. Device for recording weaving faults. 3,977,441, Cl. 139-1.00R.

Svoboda, Hubert: *See—*
Zahradnik, Stanislav; Svoboda, Hubert; Basek, Karel; Ruta, Vladislav; and Koza, Frantisek, 3,977,443.

Swales, Peter David; and Wakelin, Richard John, to Dunlop Limited. Tires. 3,977,455, Cl. 152-330.00L.

Swan, Walter B. Polygonal carton. 3,977,594, Cl. 229-39.00R.

Swander, Kenneth D., Jr.; and Sibley, Bruce D., to Aeroquip Corporation. Double piston brake actuator. 3,977,308, Cl. 92-63.000.

Swann, Edward J.: *See—*
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Sybron Corporation: *See—*
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Syntex Corporation: *See—*
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Fried, John H.; and Harrison, Ian J., 3,978,124.

Szepessy, Istvan: *See—*
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Szoke, Sandor; Lugosi, Gyorgy; Csermely, Gyorgy; Bakonyi, Maria; Zsolnai, Tibor; and Szepessy, Istvan, to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT. Water-soluble 1 and/or 2 acid alkylene imidazoles. 3,978,217, Cl. 424-245.000.

Tabroff, William, to USM Corporation. Molding bands. 3,977,033, Cl. 12-54.300.

Tada, Masayuki: *See—*
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Taguchi, Chiaki, to Central Glass Co., Ltd. Apparatus for measuring a width of a glass ribbon in plate glass manufacturing. 3,977,858, Cl. 65-158.000.

Tahbaz, Pirouz: *See—*
Steinman, Martin; and Tahbaz, Pirouz, 3,978,224.

Takada, Kazuo: *See—*
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Takada, Masaki: *See—*
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Takahashi, Eizi: *See—*
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Takahashi, Kazuyoshi: *See—*
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Takahashi, Yoshitaka: *See—*
Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; Takeda, Yasuo; and Takahashi, Yoshitaka, 3,977,838.

Takai, Norio, to Nippondenso Co., Ltd. Liquid-level detecting device. 3,978,299, Cl. 200-84.00C.

Takamatsu, Ikuo, to Yoshida Kogyo Kabushiki Kaisha. Reusable slide fastener with emergency opening means. 3,977,051, Cl. 24-205.00R.

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Tanaka, Junzo; Takami, Tsuyoshi; and Nakano, Chikao, 3,978,305.

Takase, Seiji, to Mitsubishi Jukogyo Kabushiki Kaisha. Method for casting metallic material while toughening the cast piece. 3,977,911, Cl. 148-3.000.

Takeda Chemical Industries, Ltd.: *See—*
Kuwada, Yutaka; Natsugari, Hideaki; and Meguro, Kanji, 3,978,058.

Takeda, Kazutoshi, to Kabushiki Kaisha Daini Seikosha. Solid electrolyte cell. 3,977,899, Cl. 136-83.00R.

Takeda, Yasuo: *See—*
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Takei, Haruo: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Iwamoto, Atsuo, 3,977,883.

Takeuchi, Masato: *See—*
Matsuda, Shimpei; Nakajima, Fumito; Takeuchi, Masato; Uno, Shigeo; Kato, Akira; Imanari, Makoto; and Watanabe, Yoshihisa, 3,977,836.

Takigawa, Takamura: *See—*
Tsuruta, Sucichi; Nishiguchi, Hiroharu; Takigawa, Takamura; Hikawa, Shiro; and Kitasumi, Kazunori, 3,978,480.

Takita, Kiyoshi: *See—*
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Yoshinaga, Eiichi; Wakamori, Shigeki; Dowke, Gosaburo; and Takita, Kiyoshi, 3,978,228.

Takiyama, Eiichiro; Sugimoto, Toshiaki; and Hanyuda, Toshiaki, to Showa High Polymer Co., Ltd. Curable resinous composition comprising combination of polymerizable cycloacetal compound with unsaturated polyester. 3,978,155, Cl. 260-836.000.

Talmage, Peter Guy, to Coulter Information Systems, Inc. Reciprocating corona producing apparatus. 3,978,380, Cl. 317-262.00A.

Tamao, Yoshikuni: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Tamao, Yoshikuni; Tonomura, Shinji; and Ohkubo, Kazuo, 3,978,045.

Tan, Yoichi; and Ono, Shinji, to Nippon Electric Company, Ltd. Frame synchronizing device. 3,978,285, Cl. 178-69.50R.

Tanaka, Atsuyuki; and Tanaka, Susumu, to Minolta Camera Kabushiki Kaisha. Image transmission device for slit scanning type photocopying machine. 3,977,777, Cl. 355-1.000.

Tanaka, Junzo; Takami, Tsuyoshi; and Nakano, Chikao, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 3,978,305, Cl. 219-10.55E.

Tanaka, Masashi, to Fuji Jidoki Kabushiki Kaisha. Tying device. 3,977,314, Cl. 100-4.000.

Tanaka, Susumu: *See—*
Tanaka, Atsuyuki; and Tanaka, Susumu, 3,977,777.

Tanaka, Takashi; and Nomura, Yasuo, to Matsushita Electric Industrial Co., Ltd. Multi-channel dual-gap magnetic head. 3,978,523, Cl. 360-121.000.

Tanguy, Christian: *See—*
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Tani, Tatsuo, formerly Nishikawa: *See—*
Suzuki, Shigeru; Omi, Kyoji; and Tani, Tatsuo, formerly Nishikawa, 3,977,666.

Tanigawa, Takeshi, to Hochiki Corporation. Circuit conduction test arrangement for emergency alarm systems. 3,978,476, Cl. 340-410.000.

Tanisawa, Shigeru: *See—*
Katayose, Shinji; Uchiyama, Hiromichi; Tanisawa, Shigeru; and Hamada, Mitsuharu, 3,977,487.

Tank, Eggert, to Daimler-Benz Aktiengesellschaft. Sealing element for a regenerative heat-exchanger. 3,977,465, Cl. 165-9.000.

Tankey, Howard William: *See—*
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Tantlinger, Keith W., to Rohr Industries, Inc. Multiple belt tension control mechanism. 3,977,266, Cl. 74-242.11C.

Tarbell, Harlan E.; Mogg, Donald W.; and Ruff, David L., to Grefco, Inc. Coating for porous surfaces. 3,978,264, Cl. 428-314.000.

Tarkan, Stuart E.: *See—*
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Tatro, Henry J.: *See—*
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Tatsumi, Hideo, to Hitachi, Ltd. Circuit breaker. 3,978,373, Cl. 317-18.00D.

Taub, Bernard, to Allied Chemical Corporation. Triethanolamine methylenedianiline curing agent and the process for using same in the manufacture of high resilient cold molded foam. 3,977,989, Cl. 252-182.000.

Taylor Electrical Instruments Limited: *See—*
Friend, Terence, 3,978,404.

Taylor, Michael Paul: *See—*
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Taylor, Ruel E.; and Wormwood, Alston R., to Ruel E. Taylor, Inc. Method and apparatus for forming a plurality of even-edged piles of flexible sheets. 3,977,671, Cl. 271-221.000.

TDK Electronics Company, Limited: *See—*
Umeki, Shinji; Shibata, Fujio; and Takada, Kazuo, 3,977,985.

Teagarden, LeRoy O.; Adahan, Carmeli; and Ashmore, William A., to Singer Company, The. Ribbon cassette and ribbon advance. 3,977,512, Cl. 197-168.000.

Technical Industries, Inc.: *See—*
Jaquith, Burton Kent, 3,977,362.
Jaquith, Burton Kent, 3,978,460.

Teer, Glenn E.; Higgins, Jerry G.; and Warren, George D., to Cosden Technology, Inc. Production of high solids containing polyethylene emulsions. 3,978,017, Cl. 260-29.6XA.

Teijin Limited: *See—*
Ichikawa, Yataro; and Yamamoto, Mamoru, 3,978,092.
Yoshikawa, Hirofumi; Hamana, Isao; and Kumakawa, Shiro, 3,977,175.

Teisseire, Paul Jose; and Plattier, Marcel, to S.A. des Etablissements Roure-Bertrand Fils & Justin Dupont. Cis methyl dihydrojasmonate. 3,978,108, Cl. 260-468.00K.

Tektronix, Inc.: *See—*
Steele, Edward R., 3,978,366.
Telecommunications Radioelectriques et Telephoniques T.R.T.: *See—*
Bonnaval, Pierre, 3,978,485.
Teletype Corporation: *See—*
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Tellier, Pierre: *See—*
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Tengler, Harvey N.; and Stikeleather, Larry F., to UOP Inc. Fore and aft adjustment mechanism and seat belt anchorage for suspension seat. 3,977,725, Cl. 297-385.000.
Tenney, Horace M.: *See—*
Mertzweiller, Joseph K.; and Tenney, Horace M., 3,978,149.
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Tesi, Julius M.: *See—*
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Texas Instruments Incorporated: *See—*
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Noe, Terry Wayne, 3,978,516.
Trotta, Patrick A., 3,977,793.
Theeuwes, Felix, to Alza Corporation. Osmotic device having microporous reservoir. 3,977,404, Cl. 128-260.000.
Thermo Electron Corporation: *See—*
Coleman, Steven J.; and O'Brien, James W., 3,977,407.
Thiesler, Ingo: *See—*
Korting, Reinhard; and Thiesler, Ingo, 3,977,824.
Thiessen, Leo K.; and Smith, Conrad B., to Aeroquip Corporation. Reducing type coupling. 3,977,705, Cl. 285-112.000.
Tholander, Bent Kure; and Krarup, Svend, to Akvadan A/S. Method of biological purification of sewage. 3,977,965, Cl. 210-11.000.
Thomas, Bradley Scott. Dispensing pipette actuator system. 3,977,574, Cl. 222-391.000.
Thomas, Heinz: *See—*
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Thomas, O. Leon: *See—*
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Thominet, Michel Leon, to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France. Methods of treating a mammal afflicted with convulsions, with dialkylaminoalkyl ethers of 2-alkoxy-3,5-dihalobenzene and salts thereof. 3,978,218, Cl. 424-248.000.
Thompson, Scott Winfield: *See—*
Ethridge, Fredrick Allen; Taylor, Michael Paul; and Thompson, Scott Winfield, 3,977,059.
Thomson, Arthur J. Relay construction. 3,978,439, Cl. 335-131.000.
Thomson-CSF: *See—*
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Ostrowsky, Daniel; Jacques, Andre; and Papuchon, Michel, 3,977,763.
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Thurston, Howard E. Apparatus for covering open-bodied vehicles. 3,977,719, Cl. 296-98.000.
Tice, William A. Pneumatic needle positioning apparatus for stitching machines. 3,977,339, Cl. 112-219.00B.
Tigner, Reuben A.; and Berg, James W., to Dow Chemical Company, The. Articles having electroconductive components of highly electroconductive resinous compositions. 3,978,378, Cl. 317-258.000.
Tilve, Enrique Jesus Ramon. Eyeglass receptacle. 3,977,516, Cl. 206-5.000.
Timex Corporation: *See—*
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Khromov, Gennady Lvovich; Davydov, Anatoly Borisovich; Maichuk, Jury Fedorovich; and Tishina, Inna Fedorovna, 3,978,201.
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Toida, Takashi: *See—*
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Tokico Ltd.: *See—*
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Hayashida, Yoshihiro, 3,977,425.
Tokiwa, Fumikatsu; and Kobayashi, Takehiko, to Kao Soap Co., Ltd. Stabilized sodium percarbonate and process for preparing same. 3,977,988, Cl. 252-99.000.
Tokouzbalidis, Stilianos: *See—*
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Tokyo Gas Kabushiki Kaisha: *See—*
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Tokyo Shibaura Electric Co., Ltd.: *See—*
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Tomura, Hiroshi, to Aoki Ltd. Puzzle ring. 3,977,683, Cl. 273-155.000.
Tomura, Teruichi; Iyama, Hiroyuki; and Akatsuka, Mitsuo, to Hitachi, Ltd. Discharge lamp control circuit. 3,978,368, Cl. 315-99.000.
Tomura, Teruichi: *See—*
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Topham, William Henry, to British Petroleum Company Limited, The. Viscometer. 3,977,235, Cl. 73-54.000.
Topol, Leo E., to Rockwell International Corporation. Silver nitrite reactant for measuring $SO_2$. 3,977,830, Cl. 23-232.00R.
Topp, Bernhard; Neidhard, Horst; Pollner, Rudolf; and Friese, Karl-Hermann, to Robert Bosch G.m.b.H. Methods for producing oxygen-sensing element, particularly for use with internal combustion engine exhaust emission analysis. 3,978,006, Cl. 252-477.00R.
Toriya, Minoru: *See—*
Mizuno, Kimio; Matsuda, Tetsuo; Asano, Katsumi; Yagi, Akira; Takada, Masaki; Saito, Tetsu; Toriya, Minoru; Satoi, Shuzo; and Matsuura, Kazuo, 3,978,210.
Tornmarck, Sven Ivan Arvid, to Food Control AB. Time and temperature-dependent enzymatic indicator. 3,977,945, Cl. 195-127.000.
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Toshimitsu, Itaru; Fujii, Sakumi; and Nakajima, Taketoshi, to Toyo Soda Manufacturing Co., Ltd. Phosphoric acid purification. 3,978,196, Cl. 423-321.00S.
Totani, Kazuo: *See—*
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Toth, Geza; and Toth, Istvan, to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT. Substituted carbamoyl benzimidazole derivatives with antifungal properties. 3,978,075, Cl. 260-309.200.
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Toth, Geza; and Toth, Istvan, 3,978,075.
Toth, Tibor Endre, to Union Carbide Corporation. Voltage sensor circuit for an arc welding wire feed control. 3,978,311, Cl. 219-131.00F.
Totti, Mario Costante: *See—*
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Toya, Ko, to Hoshizaki Electric Co., Ltd. Automatic electronic ice-making control system for automatic ice-making machine. 3,977,851, Cl. 62-135.000.
Toyama, James. Jet powered marine propulsion unit. 3,977,353, Cl. 115-16.000.
Toyo Calorizing Ind. Co., Ltd.: *See—*
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Toyo Jozo Kabushiki Kaisha: *See—*
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Treuil, Bernard, to Societe d'Etudes de Machines Thermiques. Method for conditioning the intake air of a supercharged, low-compression ratio diesel engine. 3,977,195, Cl. 60-602.000.

Treuner, Uwe D.; and Breuer, Hermann, to E. R. Squibb & Sons, Inc. 3-Tetrazolyl and other derivatives of [[(alkoxy)thiocarbonyl]oxy]acetyl cephalosporins. 3,978,050, Cl. 260-243.00C.

Trischler, Gunther; and Reichert, Hartmut, to Simplex Time Recorder Company. Time recorder. 3,978,493, Cl. 346-82.000.

Triumph Werke Nurnberg A.G.: *See—*
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Trotta, Patrick A., to Texas Instruments Incorporated. Radiation energy receiver. 3,977,793, Cl. 356-218.000.

Trotter, Floyd Arthur. Stop assembly. 3,977,714, Cl. 292-343.000.

Trulson, Olof Conrad; and Litz, Lawrence Marvin, to Union Carbide Corporation. Ultrafiltration apparatus and process for the treatment of liquids. 3,977,967, Cl. 210-23.00F.

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TRW Inc.: *See—*
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TSSET Scientific and Pharmaceutical Limited: *See—*
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Tsuchiya, Shigeru; Suda, Yoshitaka; Chiyomaru, Isao; Kawada, Seigo; and Takita, Kiyoshi, to Kumiai Chemical Industry Co., Ltd. 2,4-Dimethyl-3-carboxyanilidofuran compounds. 3,978,091, Cl. 260-347.300.

Tsuda, Takeshi: *See—*
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Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Electro-optic device. 3,977,769, Cl. 350-160.0LC.

Tsukamoto, Takuzo: *See—*
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Tsuneda, Terukuni, to Canon Kabushiki Kaisha. Liquid developer for use in development of an electrostatic latent image comprising a copolymer containing an amino group converted into a quaternary ammonium salt or hydroxide. 3,977,983, Cl. 252-62.10L.

Tsunoda, Ichiro: *See—*
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Tsuruta, Masao; and Sakate, Shigeki, to Fuji Photo Film Co., Ltd. Device for separating stacked sheets. 3,977,670, Cl. 271-207.000.

Tsuruta, Sueichi; Nishiguchi, Hiroharu; Takigawa, Takamura; Hikawa, Shiro; and Kitasumi, Kazunori, to Mitsui Shipbuilding and Engineering Co., Ltd.; and Kyoritsu Dempa Co., Ltd. Method of identifying the patterns of radar signals. 3,978,480, Cl. 343-5.0DP.

Tsutsumi, Kazunobu: *See—*
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Tubeuf, Jean, to Societe Europeene de Propulsion. Projectile guidance. 3,977,629, Cl. 244-3.220.

Tuke, Michael Anthony, to National Research Development Corporation. Saws and blades therefor. 3,977,289, Cl. 83-835.000.

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Turner, Lloyd Drayton: *See—*
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Turnier, Robert H., to Hughes Aircraft Company. High voltage terminal bushing for use in high voltage circuits. 3,978,277, Cl. 174-142.000.

Tuzson, John J.; and Hallberg, Irving H., to Borg-Warner Corporation. Fuel regulator. 3,977,382, Cl. 123-139.0AW.

Tyers, G. Frank O.: *See—*
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Uchikubo, Toshichika: *See—*
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Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Method of producing a non-combustible molding material. 3,978,180, Cl. 264-42.000.

Ueda, Takeshi. Detachable spike assembly for shoes. 3,977,097, Cl. 36-67.00D.

Uehara, Keijiro: *See—*
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Uelzmann, Heinz, to General Tire & Rubber Company, The. Method and solid propellant with unsaturated aziridine cured binder. 3,977,923, Cl. 149-19.100.

Uemura, Takeshi: *See—*
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Ueno, Katsuyoshi; and Koike, Hirotami, to Nihon Denshi Kabushiki Kaisha. Illumination system in a scanning electron microscope. 3,978,338, Cl. 250-396.00R.

Uhlemann, Hans Heinrich Otto Oskar Hermann: *See—*
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Ulin, Wylie J. Adjustable support and housing for a doll and the like. 3,977,494, Cl. 181-148.000.

Ullstig, Stig Leopold, to AGA Aktiebolag. Device for optical-mechanical scanning. 3,977,760, Cl. 350-6.000.

Ulrich, Bertram R.: *See—*
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Umeki, Shinji; Shibata, Fujio; and Takada, Kazuo, to TDK Electronics Company, Limited. Magnetic recording medium comprising cobalt or cobalt alloy coated particles of spicular magnetite. 3,977,985, Cl. 252-62.550.

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Pelton, John Franklin, 3,977,974.
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Interior: *See—*
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National Aeronautics and Space Administration; administrator; with respect to an invention of:
Barnett, Morris A. Furlable antenna. 3,978,490, Cl. 343-882.000.
Broyles, Howard F.; Moacanin, Jovan; and Cuddihy, Edward F. Method of making hollow elastomeric bodies. 3,978,187, Cl. 264-129.000.
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Usami, Tamotsu, to Hitachi, Ltd. Method for manufacturing composite sintered structure. 3,978,248, Cl. 427-96.000.

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Vago, Otto Zoltan, to Scovill Manufacturing Company. Vehicle-tire-air-pressure-sensing-and-indicating device. 3,978,448, Cl. 340-58.000.

Vahle, Klaus-Heinrich. Process for making a foam plastic resin encased roller. 3,978,181, Cl. 264-46.700.

Valassis, John G.; and Holden, James R., to GTE Automatic Electric Laboratories Incorporated. I/O structure for microprocessor implemented systems. 3,978,455, Cl. 340-172.500.

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van der Aker, Cornelis Gualtherus Josephus; Faber, Jan; and van de Sluis, Nelis, to U.S. Philips Corporation. Packing containing electrical components. 3,977,522, Cl. 206-330.000.

van der Heijden, Arnoldus; and Schutte, Leonard, to Lever Brothers Company. Foodstuff containing a diester of monothiocarbonic acid. 3,978,240, Cl. 426-535.000.

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van der Hoorn, Gustaaf Herman Antonius: *See—*
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van der Lely, Ary. Implements for the displacement of crop or like material lying on the ground. 3,977,167, Cl. 56-370.000.

van der Lely, Cornelis. Soil cultivating implements. 3,977,476, Cl. 172-51.000.

van der Plaats, Petrie Johan, to U.S. Philips Corporation. Circuit arrangement for a tone pushbutton selection telephone subscriber set. 3,978,295, Cl. 179-84.0VF.

van de Sluis, Nelis: *See—*
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Van Essen, Hendrik Arie: *See—*
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Vincent, Michel; and Remond, Georges, to Science Union et Cie. Indazole derivatives, processes for making the same and pharmaceutical compositions. 3,978,044, Cl. 536-117.000.

Vinczi, William Frank: *See—*
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Vollmer, Hartfrid; Dany, Franz-Josef; and Wortmann, Joachim, to Hoechst Aktiengesellschaft. Process for making polyols containing halogen and phosphorus. 3,978,170, Cl. 260-968.000.

von Allworden, Wilhelm, to Jean Walterscheid GmbH. Coupling hook for a tractor three-point hitch. 3,977,698, Cl. 280-461.00A.

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Wagatsuma, Toshiaki, to Kabushiki Kaisha Komatsu Seisakusho. Shock-absorbing push-pull coupling for tandem scrapers. 3,977,699, Cl. 280-481.000.

Wagensonner, Eduard; Winkler, Alfred; and Winkler, Friedrich, to AGFA-Gevaert, A.G. Motion picture camera with improved frame count indicator. 3,977,776, Cl. 352-171.000.

Wagner, Sigurd: *See—*
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Walker, Robin Anthony: *See—*
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Walker, Thomas A., to Music Man, Inc. Electrical musical instrument amplifier having improved tremolo circuit, improved reverberation control, and power reduction circuit for distortion mode operation. 3,978,421, Cl. 330-124.00R.

Walker, William Foster: *See—*
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Wallman, Knut Olof Lennart. Method of assembling blower rotors. 3,977,062, Cl. 29-156.8CF.

Wallner, Felix; Oberhauser, Franz; Mildner, Heinz; Rudelstorfer, Heinrich; Drexler, Berndt; and Klicnik, Franz, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Method of deformation-free quenching of work-pieces heated to hardening temperature. 3,977,914, Cl. 148-12.400.

Walter, William Clarence. Adsorptive process for selective separation of gases. 3,977,845, Cl. 55-25.000.

Wang, Shaw S.: *See—*
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Wanous, Irvin E. Tool bar holder. 3,977,805, Cl. 408-115.00B.

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Warren, Carl D. Illuminated display box for navigational aides. 3,977,107, Cl. 40-86.00R.

Warren, George D.: *See—*
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Warren, Joseph R.: *See—*
Check, Frank T., Jr.; Eckert, Alton B., Jr.; and Warren, Joseph R., 3,978,457.

Warscheit, Helmut, to Mergenthaler Linotype GmbH. Film cassette for a photocomposing machine. 3,978,495, Cl. 354-5.000.

Wason, Satish K., to J. M. Huber Corporation. Amorphous precipitated siliceous pigments and improved process for producing such pigments. 3,977,893, Cl. 106-288.00B.

Watanabe, Kenichi: *See—*
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Watanabe, Yoshihisa: *See—*
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Watson, Bernard William. Artificial larynx. 3,978,286, Cl. 179-1.0AL.

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Watson, Kenneth, to Westland Aircraft Limited. Helicopter power transmission systems. 3,977,632, Cl. 244-60.000.

Watson, Robert George. Storage structure for granular materials. 3,977,541, Cl. 214-16.00R.

Watterback, Paul Gunnar. Anchor. 3,977,351, Cl. 114-208.00R.

Weaver, Richard L. Apparatus for discharging silage from a silo. 3,977,543, Cl. 214-17.0DA.

Weber, Klaus; Trapp, Lothar; and Kleinmaier, Gunther, to Carl Zeiss-Stiftung. Method of recognition and interpretation of objects in microscopic observations. 3,977,791, Cl. 356-168.000.

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Weissenbach, Joseph. Contained volatile liquids vapor retention system. 3,977,379, Cl. 123-136.000.

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Welstead, William John, Jr., to A. H. Robins Company, Incorporated. 1-Cyclopropyl-1-phenyl-ω-amino-1-alkanols. 3,978,130, Cl. 260-570.600.

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Wernstedt, Gunnar. Rotational acceleration sensor and method. 3,977,256, Cl. 73-515.000.

West, Burke A.; and Bethell, Michael R., to Monroe Auto Equipment Company. Snow vehicle suspension system. 3,977,485, Cl. 180-5.00R.

West, Royston John: *See—*
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Katzakian, Arthur, Jr.; Weyland, Herman H.; Steele, Roger B.; and Gold, Marvin H., 3,978,026.

White, Bobbie L., to Gym-Dandy, Inc. Support structure. 3,977,642, Cl. 248-309.00R.

White, David John, to Powder Couplings Limited. Clutches and vibration dampers. 3,977,505, Cl. 192-105.00A.

White, Harry Gregory: *See—*
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White, Jackie L., to R. J. Reynolds Tobacco Company. Smoking materials. 3,977,412, Cl. 131-2.000.

White, Jackie L., to R. J. Reynolds Tobacco Company. Smoking materials. 3,977,413, Cl. 131-2.000.

White, Jackie L., to R. J. Reynolds Tobacco Company. Smoking materials. 3,977,414, Cl. 131-2.000.

White, Jackie L., to R. J. Reynolds Tobacco Company. Smoking compositions. 3,977,415, Cl. 131-2.000.

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White, Timothy P., to Nobel Scientific Industries, Inc. Asceptic filling apparatus and method. 3,977,445, Cl. 141-5.000.

White, William D.: *See—*
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Whited, Dexter M. Wind drag reducer for towed vehicles. 3,977,716, Cl. 296-1.00S.

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Wilke, Gunther; Bogdanovic, Borislav; and Pauling, Horst, to Studiengesellschaft Kohle m.b.H. Process for the preparation of optically active carbon compounds. 3,978,147, Cl. 260-666.00A.

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Willard, Frank G., to Westinghouse Electric Corporation. System and method for programmable sequence control. 3,978,454, Cl. 340-172.500.

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Williams, Chester I. Means for connecting abutting form panels and for mounting a tie rod. 3,977,647, Cl. 249-191.000.

Williams, Donald E.: *See—*
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Willis, Roderick M.; and Oldfather, Charles L., to Keystone Engineering & Products Co. Inc. Apparatus for and method of filtering solid particles from a particulate-bearing liquid. 3,977,970, Cl. 210-44.000.

Willis, William E.: *See—*
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Winyard, Frank Leslie; Graham, James; and Brattstrom, Edward Henry, to Kemtron Properties Pty. Limited. Means for adjusting the movement of moving head fans. 3,977,260, Cl. 74-86.000.

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Wise, Donald L., to Dynatech Corporation. Sustained release of pharmaceuticals from polyester matrices. 3,978,203, Cl. 424-22.000.

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With, Bror. Planing or semiplaning boat. 3,977,347, Cl. 114-66.50S.

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Wittrock, Ludwig; Brand, Heinz; and Konig, Helmut, to Wittrock, Ludwig. Apparatus for working plastic materials. 3,977,658, Cl. 259-192.000.

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Yamaguchi, Shunzo; Igashira, Toshihiko; and Hujita, Masami, to Nippon Soken, Inc. Rotary piston engine. 3,977,368, Cl. 123-8.130.

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Yonemitsu, Eiichi; Kamiyama, Seiichi; Kanada, Toshiaki; and Hattori, Takeshi, to Mitsubishi Gas Chemical Company, Inc. Thermoplastic resin compositions. 3,978,158, Cl. 260-873.000.

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Yoshinaga, Eiichi; Wakamori, Shigeki; Dowke, Gosaburo; and Takita, Kiyoshi, to Kumiai Chemical Industry Co., Ltd. Method for killing noxious fungi in plants using dihalo sulfonates. 3,978,228, Cl. 424-303.000.

Yoshino, Takehiko; and Mohri, Katsuo, to Nippon Hoso Kyokai; and Hitachi, Ltd. Receiver for use in a multi-level code transmission system. 3,978,284, Cl. 178-69.50R.

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Yukuta, Toshio; Moki, Takao; Ohashi, Takashi; Iwami, Kouichi; and Suzuki, Akira, to Bridgestone Tire Company Limited. Process for the manufacture of improved elastomers prepared by reaction of trimellitoyl-functional polymer with epoxy compound. 3,978,154, Cl. 260-835.000.

Yurtin, John A., to General Motors Corporation. Wipe-in female terminal for printed circuits. 3,977,757, Cl. 339-217.00S.

Zahner, Marvin L. Fishing rod holder and hook setter apparatus. 3,977,117, Cl. 43-15.000.

Zahradnik, Stanislav; Svoboda, Hubert; Basek, Karel; Ruta, Vladislav; and Koza, Frantisek, to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi. Method of and apparatus for controlling pumps in looms with jet weft insertion. 3,977,443, Cl. 139-127.00P.

Zall, David M., to United States of America, Navy. Containment and riddance of oil spills. 3,977,969, Cl. 210-40.000.
Zambelli, Celestino; and Pagani, Fiorino, to Bioimplant S.a.s. di Fiorino Pagani & C. Rigid implantations for surgical purposes. 3,977,081, Cl. 32-10.00A.
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Zelawski, Zbigniew S.; and Wendler, Norman L., to Merck & Co., Inc. Precursors for prostaglandin $E_1$. 3,978,115, Cl. 260-488.00R.
Zeller, Henry O. Holder for a golf ball marking plate. 3,977,674, Cl. 273-32.00A.
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Zeuner, Kenneth W.; and Jarman, Alonzo B., to Control Concepts, Inc. Normally closed solenoid operated valve assembly with relief function. 3,977,649, Cl. 251-82.000.
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Zugai, Charles. Lawn edger. 3,977,475, Cl. 172-15.000.
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Asin Seiki Kabushiki Kaisha: *See—*
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Bowman, Edward W., deceased (by Bowman, Muriel B., co-executrix), to E. W. Bowman Incorporated. Apparatus for annealing, conveying, transferring, and spraying glassware. Re. 28,947, Cl. 65-348.000.

Bowman, Muriel B., co-executrix: *See—*
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Gilbert, John J.: *See—*
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Guyton, Glen B. Lever for brake and clutch operation on cycle handlebars. Re. 28,943, Cl. 74-489.000.

Harrington, Timothy M.: *See—*
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Hofer, Wolfgang; Schliebs, Reinhard; Schmidt, Robert Rudolf; and Eue, Ludwig, to Bayer Aktiengesellschaft. 2-Chloroethane-(thiono)-phosphonic acid esters. Re. 28,949, Cl. 260-960.000.

Jankowiak, Erwin M.; and Brandt, Gerald H., to Dow Chemical Company, The. Straw mats for soil erosion control. Re. 28,950, Cl. 428-288.000.

Kaye, Gordon E., to P. R. Mallory & Co., Inc. Battery cartridge with hollow case of minimum weight and dimensions. Re. 28,948, Cl. 136-173.000.

Marcona Corporation: *See—*
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Marshall, J. Howard, III; and Harrington, Timothy M., to Analog Technology Corporation. Frequency-programmed electron-capture detector. Re. 28,951, Cl. 250-383.000.

Martz, Lyle F.; and Nanz, John W., to Westinghouse Electric Corporation. Blower system and control system therefor. Re. 28,946, Cl. 415-17.000.

Miscovich, John A.; and Gilbert, John J., to Marcona Corporation. Method and apparatus for excavating settled body of solids. Re. 28,945, Cl. 299-17.000.

Nanz, John W.: *See—*
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RCA Corporation: *See—*
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Schliebs, Reinhard: *See—*
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Ueda, Atumi, to Asin Seiki Kabushiki Kaisha. Hydraulic brake system. Re. 28,944, Cl. 180-132.000.

Westinghouse Electric Corporation: *See—*
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Bacon, Warren F., G. L. Entler, and A. W. McKae, to Molyneux Clocks. Clock cabinet. 241,233, 8–31–76, Cl. D10—106.

Bacon, Warren F., G. L. Entler, and A. W. McKae. Clock cabinet. 241,234, 8–31–76, Cl. D10—106.

Bacon, Warren F., G. L. Entler, and A. W. McKae, to Molyneux Clocks. Clock cabinet. 241,235, 8–31–76, Cl. D10—16.

Baumrind, Stephen J., to Larry Harold Kline. Tube holder for use with a combined splash guard and holder for bathroom accessories. 241,195, 8–31–76, Cl. D6—87.

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73.3 3,977,498
73.5 3,977,499
106A 3,977,500

CLASS 190
49 3,977,501

CLASS 192
3.3 3,977,502
21 3,977,503
89B 3,977,504
105A 3,977,505

CLASS 194
55 3,977,506
99 3,977,507
100A 3,977,508

CLASS 195
63 3,977,941
80R 3,977,942
96 3,977,943
103.5R 3,977,944
127 3,977,945
142 3,977,946

CLASS 197
1R 3,977,509
91 3,977,510
151 3,977,511
168 3,977,512

CLASS 198
38 3,977,513
193 3,977,514
213 3,977,515

CLASS 200
4 3,978,296
5A 3,978,297
6R 3,978,298
84C 3,978,299
147R 3,978,300
220 3,978,301
266 3,978,302
283 3,978,303
331 3,978,304

CLASS 201
27 3,977,947

CLASS 204
35N 3,977,948
54R 3,977,949
67 3,977,950
149 3,977,951
157.1R 3,977,952
158R 3,977,953
159.12 3,977,954
192 3,977,955
196 3,977,956
224R 3,977,957
252 3,977,958
290F 3,977,959

CLASS 206
5 3,977,516
5.1 3,977,517
141 3,977,518
216 3,977,519
270 3,977,520
315R 3,977,521
330 3,977,522
387 3,977,523

CLASS 208
11R 3,977,960
59 3,977,961
3,977,962
120 3,977,963
327 3,977,964

CLASS 209
74M 3,977,524
75 3,977,525
111.7R 3,977,526

CLASS 210
11 3,977,965
17 3,977,966
23F 3,977,967
32 3,977,968
40 3,977,969
44 3,977,970
49 3,977,971
63R 3,977,972
167 3,977,973
195S 3,977,974
315 3,977,975
321B 3,977,976
521 3,977,977
3,977,978

CLASS 211
46 3,977,527
182 3,977,528
187 3,977,529

CLASS 212
46R 3,977,530
59R 3,977,531

CLASS 213
208 3,977,532

CLASS 214
1BB 3,977,535
1H 3,977,534
3,977,536
1M 3,977,533
6DS 3,977,537
6.5 3,977,538
8.5D 3,977,539
14 3,977,540
16R 3,977,541
16.4A 3,977,542
17DA 3,977,543
77P 3,977,544
85 3,977,545
86A 3,977,546
131R 3,977,547
138R 3,977,548
318 3,977,549
730 3,977,550

CLASS 215
1C 3,977,551
13R 3,977,552
32 3,977,553
220 3,977,554
247 3,977,555
256 3,977,556
274 3,977,557

CLASS 219
10.55B 3,978,306
10.55E 3,978,305
10.77 3,978,307
89 3,978,308
104 3,978,309
124 3,978,310
131F 3,978,311
240 3,978,312
285 3,978,313
361 3,978,314
543 3,978,315
3,978,316

CLASS 220
1.5 3,977,558
90.4 3,977,559
265 3,977,560
269 3,977,561
270 3,977,562
306 3,977,563
346 3,977,564

CLASS 221
63 3,977,565
222 3,977,566

CLASS 222
39 3,977,567
80 3,977,568
105 3,977,569
174 3,977,570
180 3,977,571
182 3,977,572
368 3,977,573
391 3,977,574
396 3,977,575
402.1 3,977,576
499 3,977,577
541 3,977,578
591 3,977,579

CLASS 223
43 3,977,580
44 3,977,581

CLASS 224
1R 3,977,582
2B 3,977,583
5H 3,977,584

CLASS 225
101 3,977,585

CLASS 226
2 3,977,586
74 3,977,587
168 3,977,588
180 3,977,589
190 3,977,590

CLASS 229
7R 3,977,591
28R 3,977,592
38 3,977,593
39R 3,977,594
45R 3,977,595
54R 3,977,596
73 3,977,597

CLASS 233
26 3,977,598

CLASS 235
61.11E 3,978,317
3,978,318
3,978,319
61.12M 3,978,320
92TC 3,978,321
92T 3,978,322
144HC 3,977,599
150.52 3,978,323
151.3 3,978,324
3,978,325
152 3,978,326
153AE 3,978,327
156 3,978,328
176 3,978,329

CLASS 236
93R 3,977,600

CLASS 237
1A 3,977,601

CLASS 239
74 3,977,602
76 3,977,603
102 3,977,604
104 3,977,605
145 3,977,606
3,977,607
230 3,977,610
410 3,977,608
417.3 3,977,609

CLASS 240
10.6R 3,978,330
25 3,978,331
51.11R 3,978,332

CLASS 241
251 3,977,611
254 3,977,612
261.3 3,977,613

CLASS 242
2 3,977,614
41 3,977,615
46.4 3,977,616
56.3 3,977,627
56.8 3,977,617
58.3 3,977,618
67.1R 3,977,619
67.4 3,977,620
75.5 3,977,621
77.2 3,977,622
191 3,977,623
198 3,977,624
3,977,625
199 3,977,626

CLASS 244
3.16 3,977,628
3.22 3,977,629
43DB 3,977,630
50 3,977,631
60 3,977,632
169 3,977,633

CLASS 246
128 3,977,634
387 3,977,635

CLASS 248
2 3,977,636
102 3,977,638
125 3,977,639
205R 3,977,640
278 3,977,641
309R 3,977,642
339 3,977,643
384 3,977,644
484 3,977,645
514 3,977,637

CLASS 249
50 3,977,646
191 3,977,647

CLASS 250
211J 3,978,333
225 3,978,334
320 3,978,335
366 3,978,336
367 3,978,337
383 Re.28,951
396R 3,978,338
402 3,978,339
462 3,978,340
492R 3,978,341
495 3,978,342
551 3,978,343

CLASS 251
59 3,977,648
82 3,977,649
129 3,977,650

CLASS 252
8.55E 3,977,981
8.8 3,977,979
3,977,980
50 3,977,987
60 3,977,982
62.1L 3,977,983
62.54 3,977,984
62.55 3,977,985
78.3 3,977,986
99 3,977,988
182 3,977,989
188.3R 3,977,990
301.4S 3,977,991
316 3,977,992
317 3,977,993
392 3,977,994
408 3,977,995
429B 3,977,997
431C 3,977,996
435 3,977,998
441 3,977,999
447 3,978,000
453 3,978,001
456 3,978,002
3,978,003
462 3,978,004
470 3,978,005
477R 3,978,006
506 3,978,007
522 3,978,008
3,978,009
525 3,978,010

CLASS 254
57 3,977,651
164 3,977,652

CLASS 256
10 3,977,653
59 3,977,654

CLASS 259
107 3,977,655
108 3,977,656
180 3,977,657
192 3,977,658

CLASS 260
2.5AJ 3,978,011
19R 3,978,012
27BB 3,978,013
28.5AS 3,978,014
29.4UA 3,978,015
29.6TA 3,978,016
29.6XA 3,978,017
40R 3,978,018
42.2 3,978,019
45.7S 3,978,022
45.75S 3,978,023
45.8A 3,978,020
45.85T 3,978,024
45.9KA 3,978,021
46.5UA 3,978,025
47EC 3,978,026
47EP 3,978,027
61 3,978,028
112.5R 3,978,034
3,978,035
151 3,978,037
176 3,978,038
187 3,978,039
205 3,978,040
239BC 3,978,046
3,978,047
239B 3,978,045
239.1 3,978,056
239.55R 3,978,048
240G 3,978,049
3,978,068
243A 3,978,052
243C 3,978,050
3,978,051
3,978,053
247.5D 3,978,055
247.5E 3,978,054
250A 3,978,057
256.4F 3,978,058
256.5R 3,978,059
276 3,978,062
286R 3,978,063
287A 3,978,065
287K 3,978,064
288CF 3,978,066
289C 3,978,067
293.7 3,978,069
294.8G 3,978,070
295K 3,978,071
295.5R 3,978,072
306.7C 3,978,078
307H 3,978,073
308B 3,978,074
309.2 3,978,075
309.5 3,978,076
310A 3,978,077
326N 3,978,079
326.1 3,978,080
329AM 3,978,083
329HS 3,978,082

332.2C 3,978,084
333 3,978,085
340.5 3,978,086
3,978,097
340.7 3,978,087
340.9 3,978,088
345.1 3,978,089
345.2 3,978,090
347.3 3,978,091
347.8 3,978,092
348R 3,978,093
378 3,978,094
3,978,095
384 3,978,096
404 3,978,098
404.8 3,978,099
410.9R 3,978,100
429R 3,978,101
429 3,978,102
448.2E 3,978,104
448.8R 3,978,103
453PH 3,978,105
453R 3,978,106
455A 3,978,107
468K 3,978,108
471A 3,978,109
473A 3,978,110
3,978,111
3,978,112
3,978,113
3,978,114
488R 3,978,115
500.5H 3,978,116
523R 3,978,117
3,978,118
3,978,119
547 3,978,120
551C 3,978,121
553A 3,978,123
553E 3,978,122
558R 3,978,124
561A 3,978,125
564G 3,978,126
570D 3,978,128
570.5P 3,978,061
570.5R 3,978,127
3,978,129
570.6 3,978,130
576 3,978,131
590D 3,978,132
592 3,978,133
599 3,978,134
602 3,978,135
603R 3,978,136
608 3,978,137
610B 3,978,138
613D 3,978,139
617C 3,978,140
621C 3,978,141
3,978,142
645 3,978,143
649R 3,978,144
653.6 3,978,145
655 3,978,146
666A 3,978,147
680B 3,978,148
683.3 3,978,150
683.9 3,978,149
830P 3,978,152
830S 3,978,151
835 3,978,153
3,978,154
836 3,978,155
859R 3,978,156
3,978,157
873 3,978,158
3,978,159
874 3,978,160
877 3,978,161
878R 3,978,162
885 3,978,163
3,978,164
894 3,978,165
927R 3,978,166
3,978,167
930 3,978,168
944 3,978,169
960 Re.28,949
968 3,978,170
969 3,978,171
973 3,978,172
984 3,978,173

**CLASS 261**

29 3,978,174
50A 3,978,175
122 3,978,176

**CLASS 264**

.5 3,978,177
25 3,978,178
37 3,978,179
42 3,978,180
46.7 3,978,181
51 3,978,182
87 3,978,183
89 3,978,184
93 3,978,185
102 3,978,186
129 3,978,187
139 3,978,188
140 3,978,036
229 3,978,189
242 3,978,190
285 3,978,191
290N 3,978,192

**CLASS 266**

245 3,977,659
265 3,977,660

**CLASS 269**

57 3,977,661
60 3,977,662
153 3,977,663
325 3,977,664

**CLASS 270**

4 3,977,665

**CLASS 271**

9 3,977,666
64 3,977,667
126 3,977,668
180 3,977,669
207 3,977,670
221 3,977,671
264 3,977,672
277 3,977,673

**CLASS 272**

131 3,977,676

**CLASS 273**

32A 3,977,674
85D 3,977,675
100 3,977,678
134C 3,977,680
134D 3,977,677
3,977,679
135AC 3,977,681
136A 3,977,682
155 3,977,683

**CLASS 274**

5R 3,977,684

**CLASS 277**

89 3,977,685

**CLASS 279**

1K 3,977,686
2R 3,977,687

**CLASS 280**

33.99H 3,977,689
47.13B 3,977,690
81R 3,977,691
87HA 3,977,692
91 3,977,693
112A 3,977,694
145 3,977,695
284 3,977,697
461A 3,977,698
481 3,977,699
633 3,977,688
685 3,977,700
744 3,977,696
745 3,977,701

**CLASS 285**

18 3,977,702
26 3,977,703
27 3,977,704
112 3,977,705
157 3,977,706
265 3,977,707
342 3,977,708
368 3,977,709
382.5 3,977,710

**CLASS 290**

1R 3,978,344
54 3,978,345

**CLASS 292**

202 3,977,711
338 3,977,712
343 3,977,714

**CLASS 293**

69R 3,977,713

**CLASS 294**

19R 3,977,715

**CLASS 296**

1S 3,977,716
43 3,977,717
57R 3,977,718
98 3,977,719
137C 3,977,720

**CLASS 297**

45 3,977,721
143 3,977,722
173 3,977,723
385 3,977,724
3,977,725

**CLASS 298**

5 3,977,726

**CLASS 299**

17 Re.28,945

**CLASS 301**

66 3,977,728
97 3,977,727

**CLASS 302**

27 3,977,729
64 3,977,730

**CLASS 303**

6C 3,977,731
6R 3,977,732
21BE 3,977,733
21F 3,977,734
22R 3,977,735

**CLASS 307**

51 3,978,346
215 3,978,347
229 3,978,348
255 3,978,349
3,978,350
306 3,978,351
308 3,978,352

**CLASS 308**

6C 3,977,736
36.2 3,977,737
134.1 3,977,738
187 3,977,739
194 3,977,740
207R 3,977,741

**CLASS 310**

8.1 3,978,353
60R 3,978,354
74 3,978,355
156 3,978,356
168 3,978,357
257 3,978,358
260 3,978,359

**CLASS 312**

111 3,977,742
207 3,977,743
231 3,977,744

**CLASS 313**

35 3,978,361
94 3,978,360
221 3,978,362
289 3,978,363
306 3,978,364
372 3,978,365
398 3,978,366
449 3,978,367

**CLASS 315**

99 3,978,368
3,978,369
151 3,978,370
169TV 3,978,371
397 3,978,372

**CLASS 316**

28 3,977,745

**CLASS 317**

18D 3,978,373
49 3,978,374
101C 3,978,375
134 3,978,376
230 3,978,377
258 3,978,378
262A 3,978,379
3,978,380

**CLASS 318**

197 3,978,381
221R 3,978,382
227 3,978,383
261 3,978,384
337 3,978,385
626 3,978,386
678 3,978,387

**CLASS 321**

10 3,978,388
13 3,978,389
44 3,978,390

**CLASS 323**

4 3,978,391
16 3,978,392
17 3,978,393
19 3,978,394
43.5R 3,978,395

**CLASS 324**

6 3,978,396
33 3,978,397
37 3,978,398
43R 3,978,399
51 3,978,400
57N 3,978,401
62 3,978,402
77A 3,978,403
115 3,978,404
158T 3,978,405

**CLASS 325**

41 3,978,406
42 3,978,407
56 3,978,408
62 3,978,409
114 3,978,410
421 3,978,411
478 3,978,412

**CLASS 328**

37 3,978,413
132 3,978,414
165 3,978,415
167 3,978,416

**CLASS 330**

4 3,978,417
23 3,978,418
30D 3,978,419
107 3,978,420
124R 3,978,421
132 3,978,422
141 3,978,423

**CLASS 331**

45 3,978,424
94.5C 3,978,425
94.5D 3,978,430
94.5H 3,978,426
3,978,428
94.5M 3,978,429
94.5P 3,978,427
108C 3,978,431
162 3,978,432

**CLASS 333**

1.1 3,978,433
6 3,978,434
18 3,978,435
30R 3,978,436
72 3,978,437

**CLASS 334**

47 3,978,438

**CLASS 335**

131 3,978,439
186 3,978,440
284 3,978,441

**CLASS 336**

92 3,978,442

**CLASS 338**

309 3,978,443

**CLASS 339**

32R 3,977,746
74R 3,977,747
75M 3,977,748
3,977,749
89R 3,977,750
95A 3,977,752
95D 3,977,751
95R 3,977,753
99R 3,977,754
143R 3,977,755
176MF 3,977,756
217S 3,977,757
224 3,977,758
275B 3,977,759

**CLASS 340**

3F 3,978,444
6R 3,978,445
7R 3,978,446
33 3,978,447
58 3,978,448
146.1BA 3,978,449
146.3C 3,978,450
147LP 3,978,451
172.5 3,978,452
3,978,453
3,978,454
3,978,455
3,978,456
3,978,457
173R 3,978,459
173.2 3,978,458
227R 3,978,460
3,978,461
243 3,978,462
244C 3,978,463
244E 3,978,464
255 3,978,465
274R 3,978,466
3,978,467
310A 3,978,468
310R 3,978,469
324AD 3,978,470
324CC 3,978,472
347DA 3,978,473
347NT 3,978,471
365E 3,978,474
409 3,978,475
410 3,978,476
3,978,477
420 3,978,478
3,978,479

**CLASS 343**

5DP 3,978,480
7VM 3,978,481
11R 3,978,482
100LE 3,978,483
754 3,978,484
767 3,978,485
781EA 3,978,486
829 3,978,487
3,978,488
874 3,978,489
882 3,978,490

**CLASS 346**

1 3,978,491
74J 3,978,492
82 3,978,493
139C 3,978,494

**CLASS 350**

6 3,977,760
61 3,977,761
96WG 3,977,762
96C 3,977,763
3,977,764
102 3,977,765
127 3,977,766
160LC 3,977,767
3,977,768
3,977,769
161 3,977,770
162SF 3,977,771
205 3,977,772
292 3,977,773
304 3,977,774

**CLASS 352**

159 3,977,775
171 3,977,776

**CLASS 354**

5 3,978,495
33 3,978,496
43 3,978,497
51 3,978,498
60L 3,978,499
123 3,978,500
206 3,978,501
225 3,978,502
250 3,978,503
285 3,978,504
307 3,978,505
324 3,978,506

**CLASS 355**

1 3,977,777
3R 3,977,778
3,977,779
18 3,977,781
30 3,977,782
64 3,977,783
67 3,977,784
133 3,977,785

**CLASS 356**

88 3,977,786
106S 3,977,787
3,977,788
120 3,977,789
136 3,977,790
168 3,977,791
209 3,977,792
218 3,977,793
244 3,977,794
256 3,977,795

**CLASS 357**

17 3,978,507
26 3,978,508
30 3,978,509
3,978,510
3,978,511
31 3,978,512
38 3,978,513
39 3,978,514
44 3,978,515
65 Re.28,952
70 3,978,516
71 3,978,517
82 3,978,518

**CLASS 358**

8 3,978,519
10 3,978,520

**CLASS 360**

14 3,978,521
104 3,978,522
121 3,978,523
137 3,978,524

**CLASS 401**

8 3,977,796
15 3,977,797
258 3,977,798

**CLASS 402**

4 3,977,799

**CLASS 403**

172 3,977,800
189 3,977,801

**CLASS 404**

69 3,977,802
72 3,977,803

**CLASS 408**

16 3,977,804
115B 3,977,805
141 3,977,806
223 3,977,807

**CLASS 415**

1 3,977,808
17 Re.28,946
29 3,977,809
89 3,977,810
121G 3,977,811

**CLASS 416**

123 3,977,812

**CLASS 417**

49 3,977,813
323 3,977,815
355 3,977,816
364 3,977,814

**CLASS 418**

196 3,977,817
201 3,977,818

**CLASS 423**

213.7 3,978,193
261 3,978,194
305 3,978,195
321S 3,978,196
332 3,978,197
443 3,978,198
461 3,978,199
570 3,978,200

**CLASS 424**

7 3,978,201
22 3,978,203
28 3,978,204
49 3,978,205
3,978,206
63 3,978,207
76 3,978,208
92 3,978,209
118 3,978,210
120 3,978,211
156 3,978,212
180 3,978,213
3,978,214
3,978,215
245 3,978,217
247 3,978,216
248 3,978,218
264 3,978,219
267 3,978,220
3,978,221
3,978,222
270 3,978,060
271 3,978,223
274 3,978,224
275 3,978,081
276 3,978,225
283 3,978,226
285 3,978,227
303 3,978,228
317 3,978,229
327 3,978,202
331 3,978,230
3,978,231

**CLASS 425**

247 3,977,820
249 3,977,821
387B 3,977,822
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## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D1— | 18 | 241,183 | | 94 | 241,200 | | 186 | 241,217 | | | 241,235 | | 52 | 241,250 | D49— | 1R | 241,266 |
| | 27 | 241,184 | | 95 | 241,201 | | 191 | 241,218 | | 57 | 241,236 | | 53 | 241,251 | D52— | 4A | 241,267 |
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| | 227 | 241,186 | | | 241,203 | | 128 | 241,220 | | 116 | 241,233 | | 14G | 241,253 | | J | 241,269 |
| | | 241,187 | | 96 | 241,204 | | 129 | 241,221 | | 131 | 241,238 | D30— | 4 | 241,254 | D56— | 4B | 241,270 |
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| | 400 | 241,189 | | 120 | 241,206 | | 271 | 241,223 | | 110 | 241,240 | | 40 | 241,256 | D59— | 2B | 241,272 |
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| 6 | : | 241,189 | | | 241,249 | | | 241,219 | | | 241,241 | | | 241,223 | | | 241,221 |
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| | | 241,191 | | | 241,251 | | | 241,258 | | | 241,254 | | | 241,246 | | | 241,278 |
| | | 241,198 | | | 241,253 | | | 241,262 | 27 | : | 241,194 | | | 241,257 | 45 | : | 241,195 |
| | | 241,199 | | | 241,260 | 18 | : | 241,236 | | | 241,266 | 37 | : | 241,202 | | | 241,230 |
| | | 241,200 | | | 241,268 | | | 241,282 | | | 241,277 | | | 241,203 | 48 | : | 241,188 |
| | | 241,205 | | | 241,271 | 21 | : | 241,220 | 29 | : | 241,183 | | | 241,226 | | | 241,215 |
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| | | 241,207 | | | 241,238 | 25 | : | 241,228 | | | 241,193 | | | 241,267 | | | 241,265 |
| | | 241,208 | | | 241,248 | | | 241,242 | | | 241,210 | | | 241,272 | | | 241,275 |
| | | 241,232 | | | 241,252 | | | 241,243 | | | 241,211 | 40 | : | 241,280 | 51 | : | 241,227 |
| | | 241,233 | | | 241,269 | | | 241,276 | | | 241,217 | 42 | : | 241,216 | 55 | : | 241,231 |
| | | 241,234 | | | 241,279 | | | 241,281 | 36 | : | 241,184 | | | 241,244 | | | 241,255 |
| | | 241,235 | 12 | : | 241,259 | 26 | : | 241,196 | | | 241,186 | | | | | | |

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